

THE IRON AGE -- December 15, 1932

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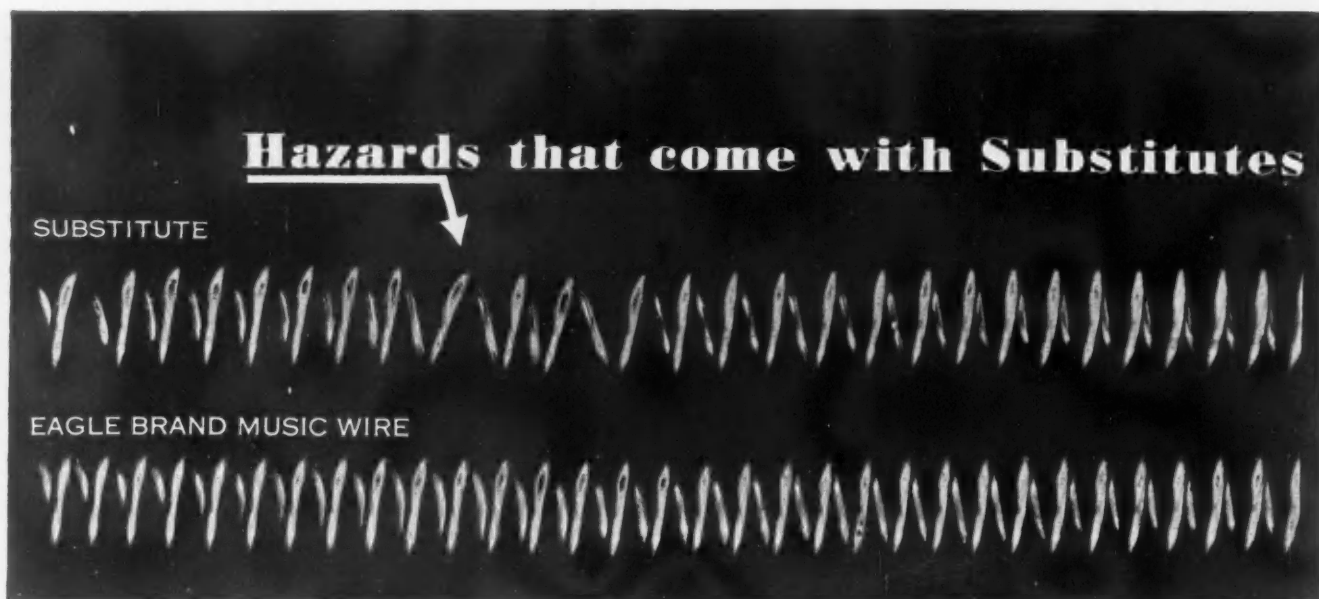
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THE IRON AGE

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When a Group Does the Buying, How Shall I Sell?

By JOHN ALLEN MURPHY
G. M. Basford Co., New York

THE depression has been teaching us a number of valuable lessons. One of these is that many companies have been lodging too much authority in the hands of a single individual. In numerous concerns tremendous responsibility has been thrown on the shoulders of one executive. More often than not, he has stood up under the burden creditably. In those cases, however, where the responsibility proved to be too heavy, the consequences have been costly.

A striking example of this is found in the career of Ivar Kreuger. He juggled hundreds of millions of dollars and swapped monopolies with empires. He initiated these stupendous deals and carried them through by his own efforts and entirely on his own responsibility. It is generally agreed that at the outset of his career Kreuger had perfectly laudable ambitions. He intended to conduct his operations honestly and did conduct them that way for several years. It was only after he became hopelessly involved in his manipulations that he resorted to dishonesty.

Had Kreuger been subject to the control of a competent executive committee, the chances are he never would have got into trouble. His excesses would have been checked by the group, which is always more conservative and usually much wiser than the individual. For this same reason all projects that would have been approved by the committee most likely would have been sound, for it is most difficult to get a fantastic idea or an

MANAGEMENT is watching the outgoing dollar as never before. Individuals no longer have sole authority to make purchases of equipment or materials. The seller must tell his story to whole groups, which sometimes include the president or the chairman of the board. The technique of merchandising has undergone a change. The "how" of selling groups is commanding more and more attention.

Some of the methods that have been successfully used in this type of merchandising are here outlined. This is the ninth article in our general series devoted to *Modern Merchandising and Marketing in the Metal Working Industry*.

impractical plan through a hard-headed executive group.

The Change in Machine Tool Buying

In recent months I made a study of the machine tool industry, particularly as to how these tools are being bought under present conditions. Prior to 1929 the buying of small tools, such as cutting tools, was concentrated in a few hands. Several persons may

have had a finger in the pie, but nearly always they were factory executives. Except where tools were regarded as capital investment, general management did not concern itself with the purchase of them.

But this situation has changed materially in the last three years. Mechanical superintendents or factory managers or production chiefs or master mechanics or purchasing agents are not buying tools on their own initiative and responsibility. To be sure these men still wield an important voice in saying what tools shall be bought, but it is not a solo voice. Management now gets in on the transaction.

In numerous plants today, buying, outside of small, routine purchases, is lodged in a committee. This group usually has from three to seven members, and generally includes representatives of the management, of the financial department, of the sales division and of the factory. As a rule this group does not do the actual buying. Generally the interviewing of salesmen is done by the purchasing agent, the mechanical superintendent, the advertising manager or whoever it is that ordinarily buys. Before buying he usually has to receive his authority from the executive group, and in many instances the sale is not confirmed until this body gives its approval.

The other day I talked to a salesman who says he has to sell to groups. I asked him how he liked this changed
(Concluded on Advertising Page 16)

Machines and Operations in Making Rockne



MOTORS for the Rockne car, made by the Rockne Motors Corp., Detroit, a subsidiary of the Studebaker Corp., are machined on a straight production line which includes 45 stations. Most of these consist of automatic machines, each of which performs a major operation and often several minor operations.

Of special interest in this scheme of productions is the fact that a unit contract was placed with the Ingersoll Milling Machine Co., Rockford, Ill., to design new and special machines, to rebuild some old Ingersoll equipment and install all machinery with necessary auxiliaries, such as conveyors and the like. The object was to provide that when the completed job was turned over to the motor company the line would produce motor blocks with a definite number of operators, at a definite rate per hour and to a specified ac-

curacy. It is significant that all specifications were fully met.

Some machine units, as now installed, will perform the number of operations as required at present. Other machines of lower capacity are installed in duplicate, while others are designed to produce at double the rate now required.

In the present equipment the machines are all in line near the north wall of the motor building at the South Bend, Ind., plant. Extending from machine to machine are roller conveyors adjusted to height of machine beds so that at no point along the line does an operator exert more effort than that necessary to push a block along the conveyor or into a machine.

Cleaned motor castings are loaded into steel buggies at the foundry, which is about $\frac{1}{4}$ mile distant from the motor line. Tractors deliver these loaded buggies to the first ma-

chine operation where an electric hoist is available to lift blocks from the buggies and place them in a drum-type miller. The same hoist is used to place the milled block on the roller conveyor which extends not alone along the 45 stations of the motor line but also through the washing department and the motor-assembly line.

Another feature of this installation is the fact that all machine operating controls, such as those for locating devices, clamps, motor push-buttons and clutch levers, are brought forward so that all operators stand with the roller conveyor between them and the machines. In many cases an operator is in charge of more than one machine, there being 50 machines and only 33 operators. When the capacity of the line is increased to 60 blocks an hour, the added machines needed will be placed in the present line, where space has been provided, by merely shortening some of the conveyor runs.

The distance between machines is such that a few blocks are in effect in storage ahead of each operation. This tends to iron out uncontrollable lost time at any station. At necessary points in the roller conveyor are turntables so that a block can be turned end for end before the next operation. At other points are turn-over cradles which turn the block bottom end up, or return the block to the position at which it stands on its base. These devices are motor driven and push-button controlled. The operator has only to push a block into the cradle when locking devices automatically take position so the block cannot move endwise; by pushing a button, the cradle swings through the desired arc and stops automatically, so the block can be pushed out on the roller conveyor, to the next machine.

Because of the fact that many machines perform more than one operation and because all operations on a given machine may not be completed at the same time many of the start and stop buttons for a machine are equipped with red lights that flash on when the start button is pushed and remain on until the longest or last operation is completed. This safety device is especially necessary for the reason that many operations or cycles on a machine are not within sight of the operator.

All fixtures were furnished by the Ingersoll company and almost with-



A motor block is removed from a truck and placed in a drum type miller where the top and bottom are rough and finished milled

Making Rockne Motor Blocks

By ROGERS A. FISKE
Western Editor, The Iron Age, Chicago

▲ ▲ ▲

It is one thing for a machine tool builder to supply individual machines for given production jobs. It is another to take a contract to supply the necessary equipment for an entire production line—in other words, to guarantee the performance of machines in a whole series of complementary operations. Such a blanket contract for the machining of the cylinder block of the Rockne automobile was placed by the Studebaker Corp. The consecutive steps in machining, together with the use of conveyors, handling cradles and clamping devices, are here detailed.

▼ ▼ ▼

out exception they are of welded steel construction. In some of the new machine tools, also, use was made of this construction. For instance, the machines for boring the cam and crank bearings have bed frames of welded steel into which have been worked needed steel tanks. The ways are of cast iron dove-tailed to the steel bed.

The first operation consists of rough and finish milling the top and bottom of the cylinder block. This work is performed in a drum-type miller, as stated, which holds six block castings. While the machine is in use the drum rotates without interruption for loading, which is done with the aid of the electric hoist. Milling cutters are in opposing pairs, one set for roughing and one set for finishing. One man operates this machine. The drum carries the blocks up and to the rear of the machine where the cutters are located and as each machined block comes back to the loading position, the operator removes it by means of the hoist and places it on the first unit of the roller conveyor.

Before passing to the next operation each block is inspected for flatness of surface (by means of feeler gages) and distance between milled surfaces. A heavy-gage plate is suspended from the ceiling and is raised and lowered by a chain fall.

The second operation consists of drilling and reaming two locating holes at opposite ends of one side of the motor base. This is a complete electrically controlled operation, even to the extent of shifting the block for proper location before drilling and

reaming. Simultaneous with the operations of drilling and reaming the locating holes, there are also drilled the core holes, water jacket drain hole and the bracket hole.

At the third machine, which is a drum-type miller, the ends of each block are rough and finish milled by opposing pairs of cutters. The next machine mills pads, after which the block is pushed along another stretch of the roller conveyor to the machine which rough bores the cylinders.

Next in line is an interesting horizontal drilling machine that is loaded with two blocks at a time and on which the oil gallery lines are drilled. Two opposing drills enter the ends of a block and each drill cuts through about 12 in. of metal. When these drills are about to meet, one automatically backs out and the other continues to cut until it breaks through to match with the hole vacated by the opposing drill. This operation results in an oil gallery hole about 24 in. long.

The next machine is a press used for drilling the 12 valve throats. Then at a two-station adjustable spindle drill press the valve guide

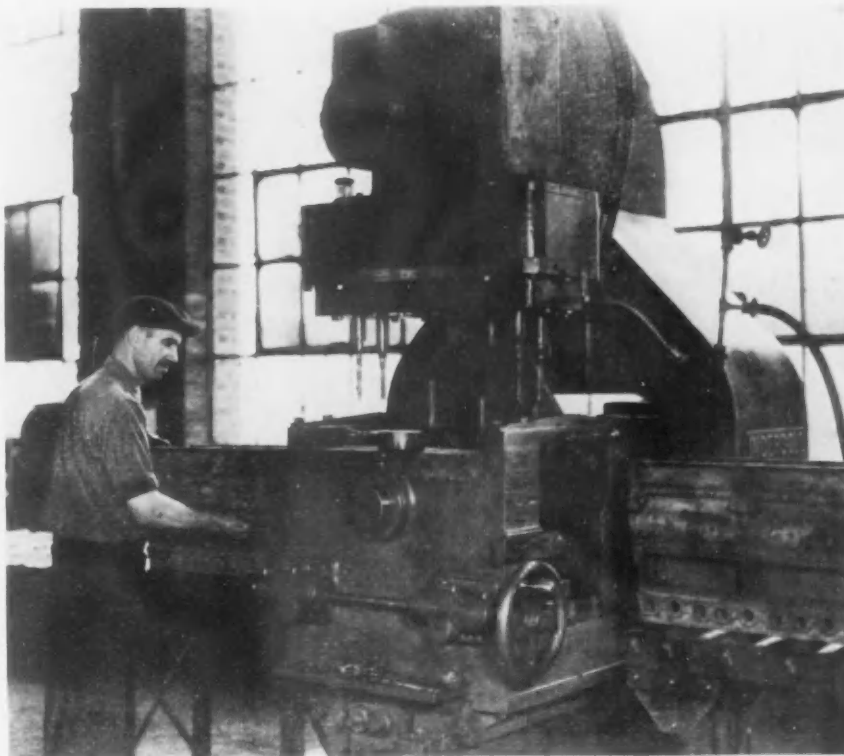
and valve tappet holes are drilled. Then follows a miller where three angle bases are finished. The next machine operation is to face the angular seat at the valve holes and to counterbore for valve spring seats.

Between the last mentioned machine and the next station is a motor-operated turn-over stand. Up to this point the block has been traveling on its base and at this point it is turned bottom end up.

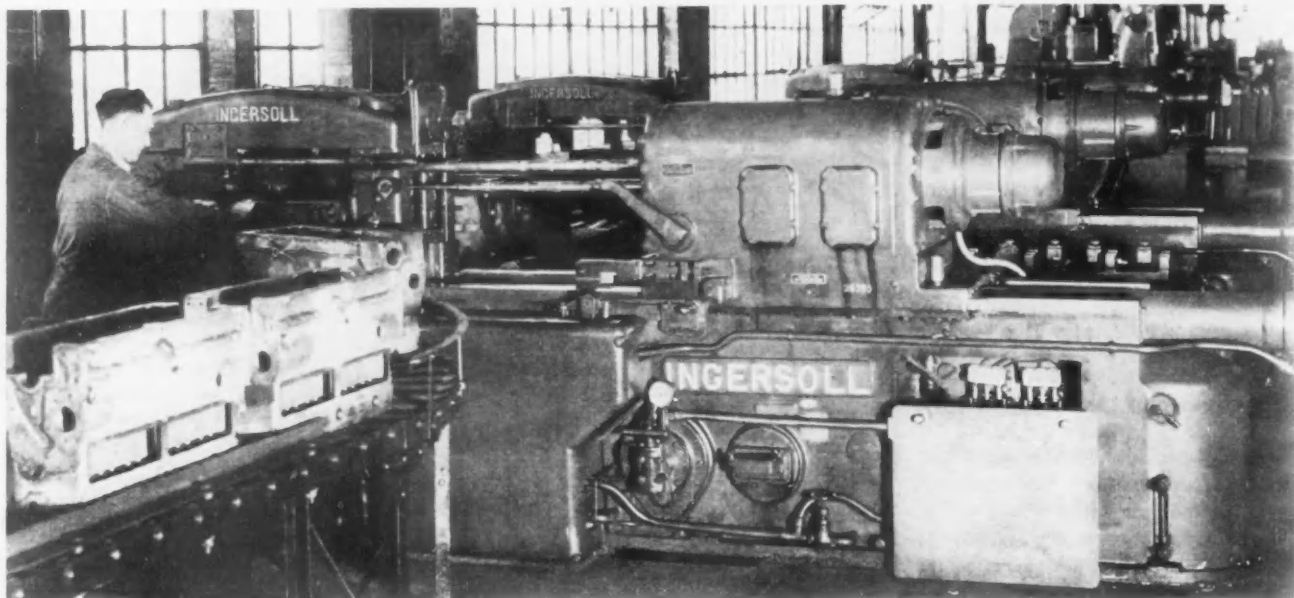
The next machine is a two-way, seven-spindle unit which automatically feeds the block into position by means of the locating holes, then rough bores the crank and cam bearings and also bores the welsh plug holes in the ends of the block. Then are located three machines, all alike, for milling bearing locks and valve cover pads.

Twelve ¼-in. angular oil leads are then drilled into the valve tappet holes, and at the same time the ends of the oil gallery line are tapped and finally the 12 oil leads are tapped.

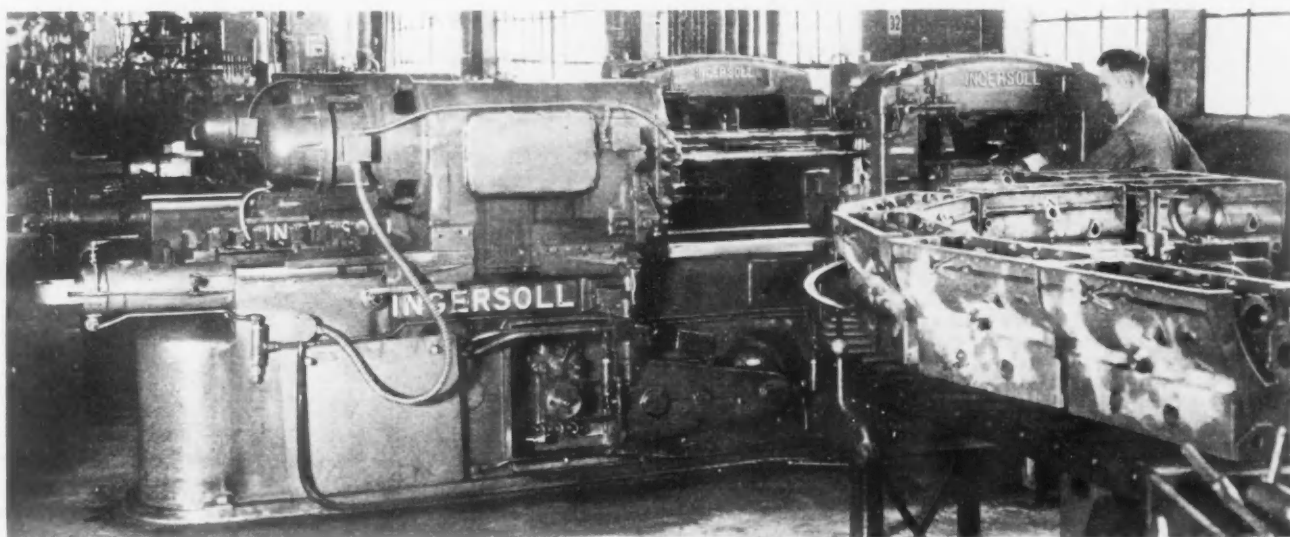
At this point in the conveyor line each block is placed in a cradle, which again turns the block so its top side is uppermost and at the same time



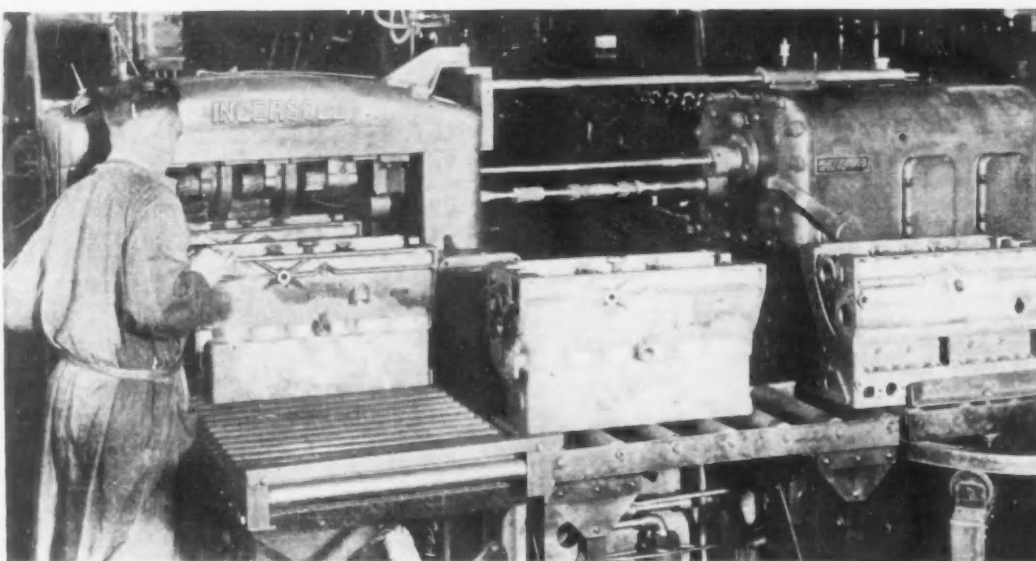
Drilling and reaming locating holes are drilled in the first cycle and the fixture then automatically moves to correct location to ream holes during the second cycle



Semi-finish boring cam and crank bearings. Note welded steel construction of this machine bed



Finish boring cam and crank bearings. Note steel tank at left end of machine welded to steel plates to form part of the bed of the machine



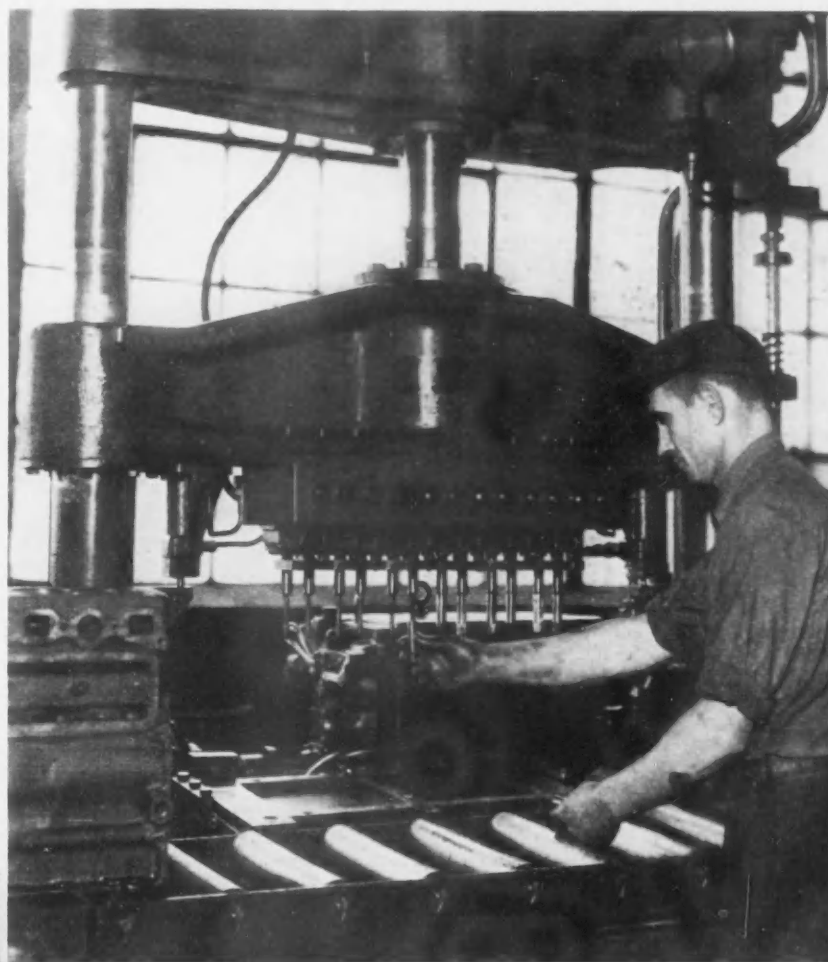
FINISH line reaming cam and crank bearings. Note turntable at extreme right of conveyor line



turns the block end for end, preparatory for the next station, where one machine finish bores the valve throats, rough reams the valve guides and rough reams the valve tappet holes. The next machine finish reams these holes.

A turntable, manually operated, turns the block end for end and it passes to the next machine where the bushing locks in the main bearings are milled. The next machine mills the main bearings to width and also mills the oil grooves. Next in line stands an Oilgear press which forces 12 broaches through the push rod holes. On the bed of this machine is a hinged bar containing copper receptacles or catchers. This bar is dropped on its side while the block is being loaded in the machine. When the block is in position the bar is turned up so that the copper receptacles are in position to catch the broaches as they fall from the push rod holes.

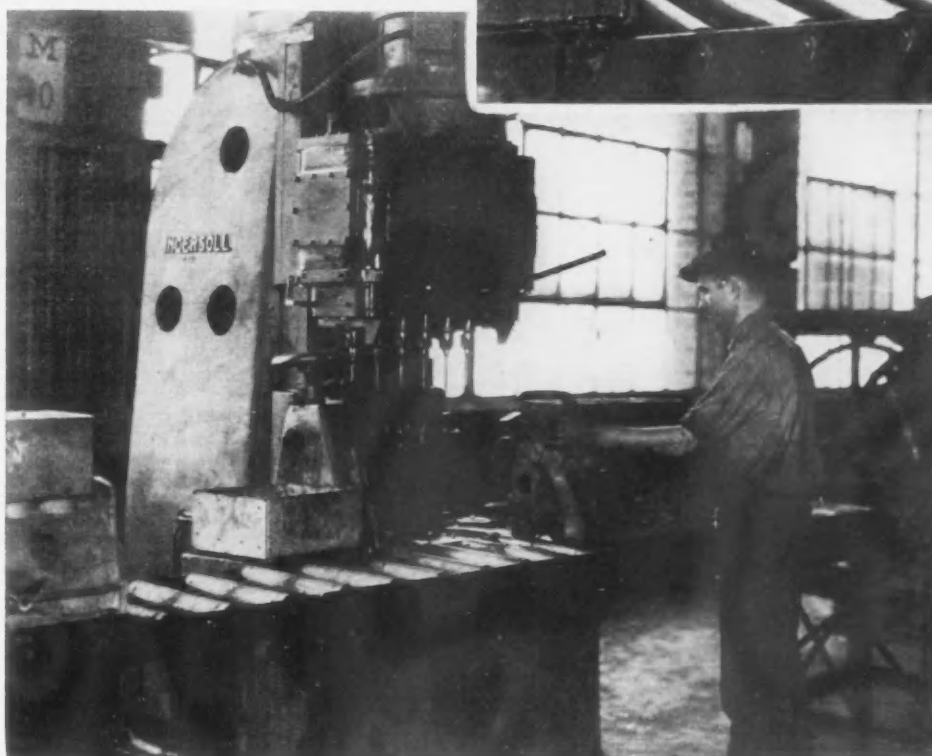
At the next station a single machine drills 24 holes in the top, 20 in the front end, 11 in the rear end, and 17 holes in the valve side of the block. Also one hole is counterbored. This unit is a four-way, 72-spindle drilling machine. After this operation there is a gager's station.



IN pressing in the valve guide bushings, split shafts hold the bushings and a series of red lights automatically register one for each bushing, when the press fit is correct in each case



FACING angular surfaces for valve holes and counterboring for valve spring seat. Lower spot-facing cutters are driven by splines in the upper cutter holder. Up feed is provided by special elevating head mounted on rear column of machine



A radial drill then is used to chamfer the holes and then a special machine drills six angular holes for the oil system. Next follows a 22-spindle machine which drills nine angular holes on the valve side, drills the water circulating holes on top and reams the oil filler hole. Two machines are required to hold the schedule of semi-finish boring the cylinders.

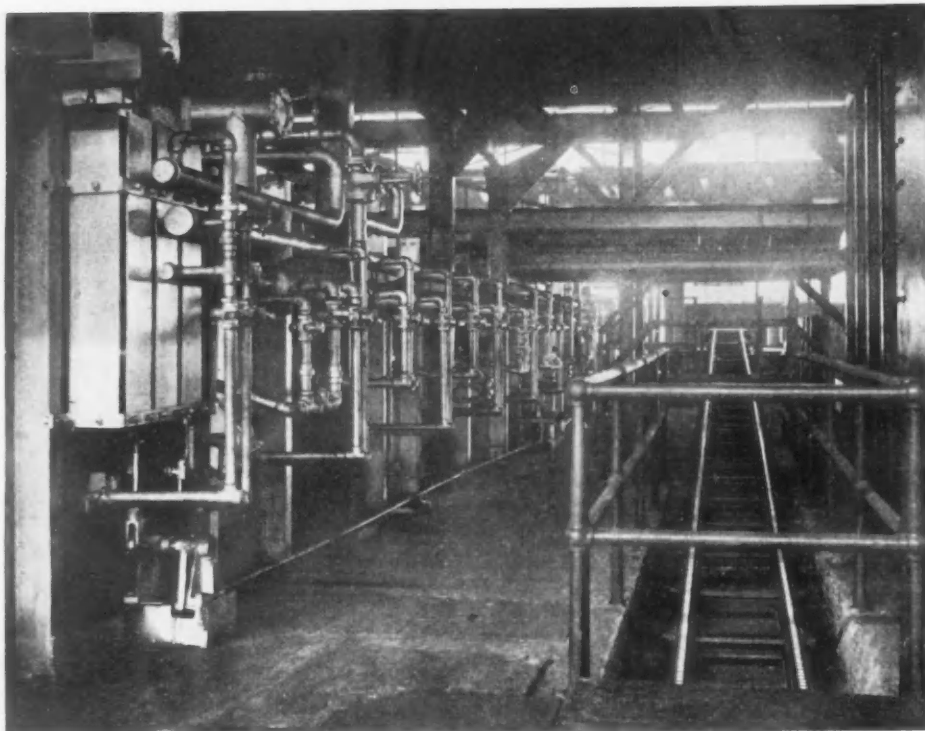
At the next machine the tops and bottoms of the cylinder bores are chamfered, nine holes are drilled in the valve side, one angular drain hole is drilled at the rear of the camshaft bearing and the breather hole is core-drilled and counterbored. The tops of the cylinder bores are first chamfered. When the desired depth is reached these tools are automatically backed

from the work and the lower tools advance to chamfer bottoms of bores.

The block is then turned end for end on a turntable and passed to a three-spindle drilling machine from which it goes to a semi-automatic hydraulic test block. The next machine drills four angular holes in the water side. The auxiliary to the oil relief hole is

(Concluded on Advertising Page 18)

Continuous Sheet Production Achieved by R



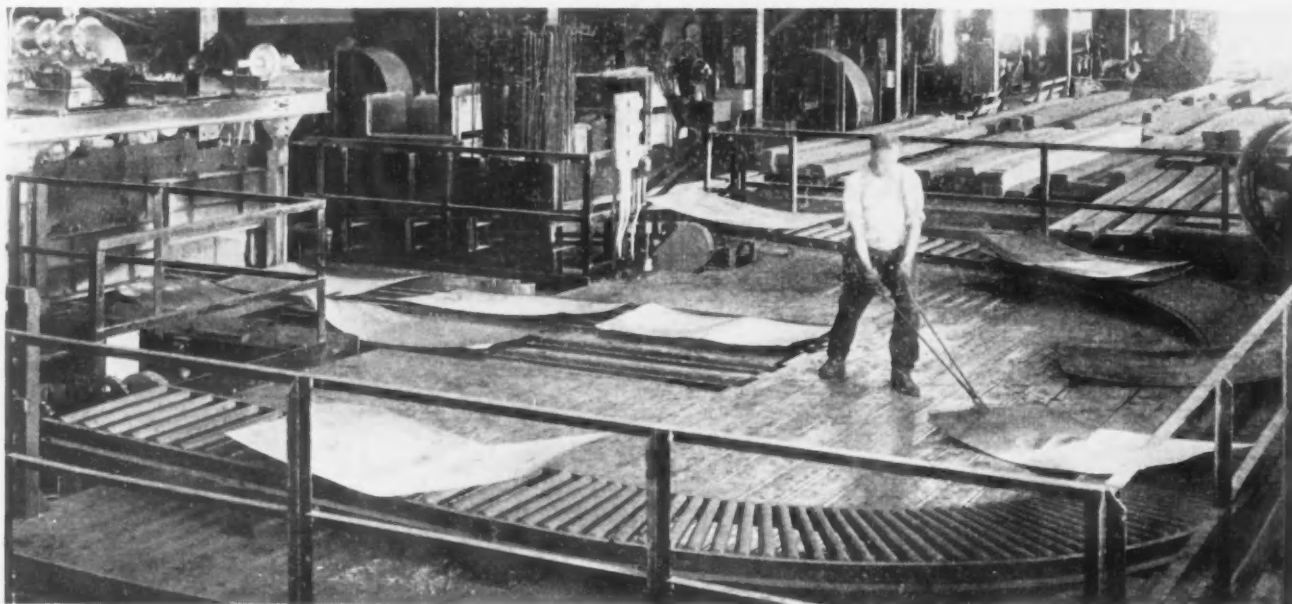
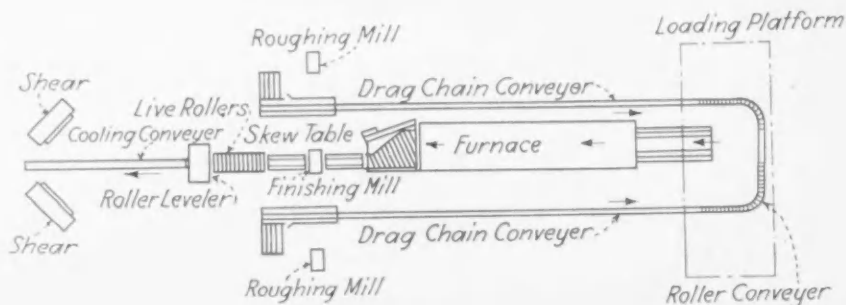
SHEET production on a two-high mill of the existing type has been more than doubled by the installation of a continuous heating furnace, mechanical feeder and catcher tables and rather extensive conveying equipment at the Niles, Ohio, works of the Republic Steel Corp., Youngstown. The installation, designated as the Autorol Method, was made by the Aetna-Standard Engineering Co., Youngstown, under its Steele patent reissue, No. 18551. The single finishing stand is supplied by two roughing stands on either side of it, and after the roughing operation is completed, further handling of the steel is almost entirely mechanical. The various operations are shown in the accompanying photographs.

ABOVE

FROM the roughing stands the packs move to a drag chain conveyor by means of a gravity run-out. These conveyors, one of which serves each stand of roughing rolls, were built by the Mathews Conveyor Co., Ellwood City, Pa., for the Aetna-Standard company, and have a speed of 200 ft. per min.

BELOW

PACKS from each of the breakdown stands reach the loading platform continuously. The walking beam type of feed is utilized, and transfer is accomplished with a minimum of manual handling.



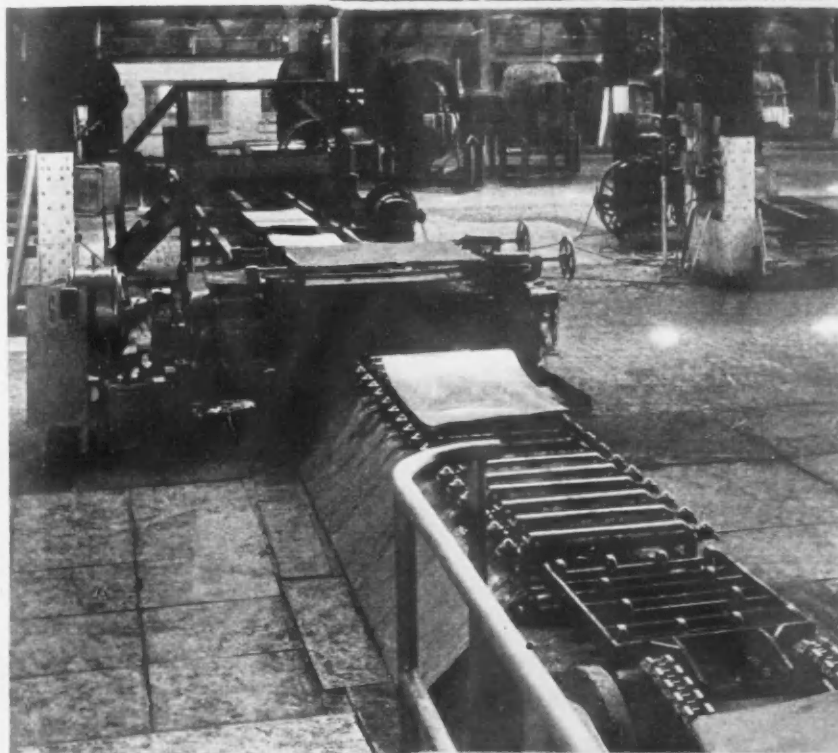
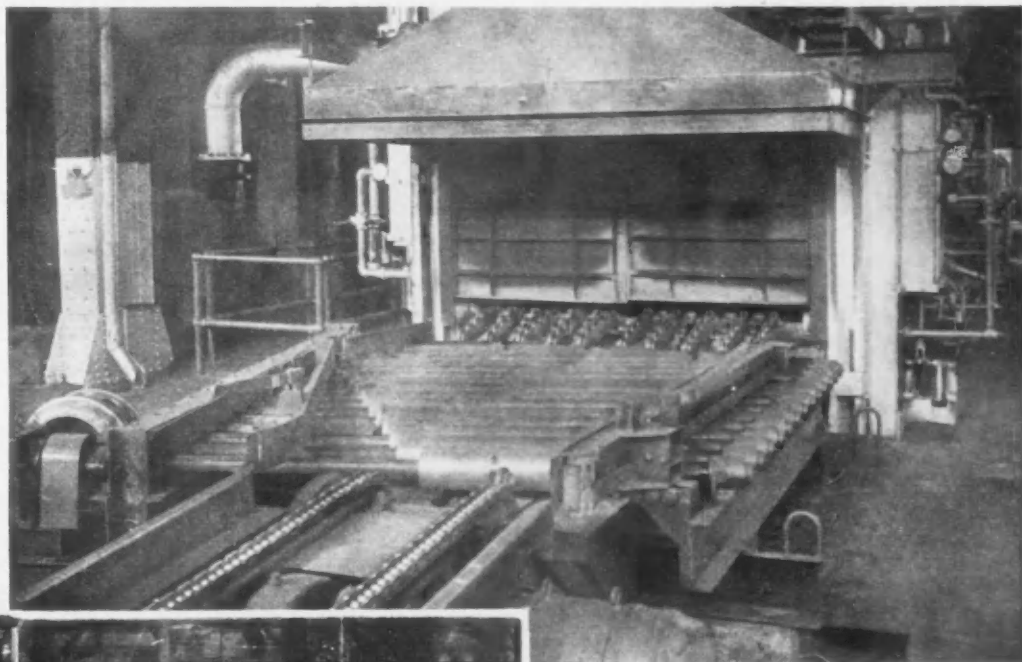
by Revamping Hot Mill at Republic Plant

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AT RIGHT

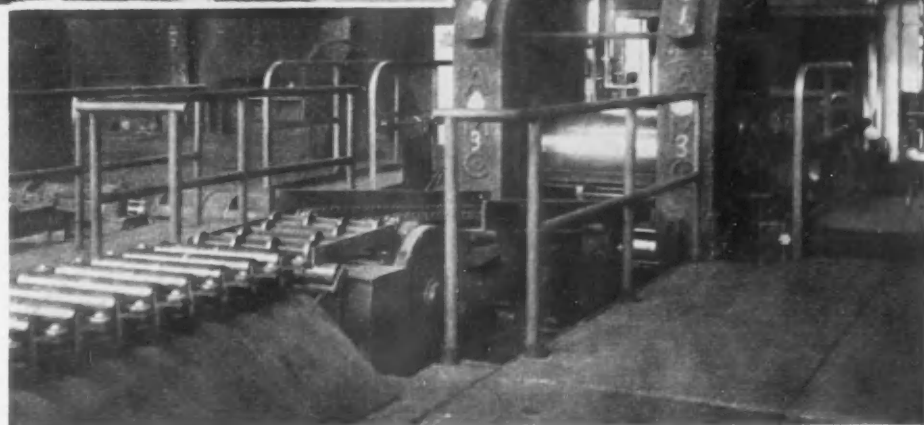
THE Surface Combustion furnace, of the continuous gas-fired type, discharges the packs alternately on a Mathews skew table where live rollers convey them swiftly to the feeder table shown in the foreground.

▼ ▼ ▼



ABOVE

THE Mathews catcher run-out table shown in the foreground can be set automatically at an angle to discharge the packs at either the right or left or to convey them straight through to the shears shown in the background. The roller leveller is used only on special stock.



BELOW

THE catcher table is in position to receive a pack from the rolls. After the first pass the sheet hits a trigger which causes both the catcher and feeder tables to rise. The motors then reverse and the sheet is passed back to the feeder table, with the roll acting as a conveyor. The table then drops and the roller automatically end and side matches the pack for the next pass. Both finishing and roughing stands are equipped with automatic top and bottom roll polishers which enable production to be carried on without frequent stops for this purpose.

Lubrication of Spur, Helical, Herringbone and Bevel Gears

By JAMES I. CLOWER

EXCEPTING design and construction, the most vital factor affecting the efficient operation of gears for the transmission of power is correct lubrication. Correct lubrication not only implies the selection of the correct lubricant for the service, but also a proper method of application.

Fig. 1 shows the conformations of several lubricated surfaces, including gear teeth. Flat sliding members (A), such as crossheads and guides, and thrust bearings, may be completely separated by an oil film. Oil, adhering to the moving surfaces, produces a wedge-like action that builds up a fluid pressure within the film sufficient to support the load. Relative motion is necessary in all cases to produce an effective oil wedge. By giving the lead-in edge of the moving member a flat chamfer or tapered clearance (B), the load-carrying capacity of the oil film is materially increased.

Since in plain journal bearings (C), the diameter of the bearing is usually slightly more than that of the journal, a wedge-shaped clearance space is formed on either side of the journal, hence as the journal revolves an effective oil wedge is formed, thereby forcing oil under pressure between the journal and bearing and establishing a supporting oil film. In journal bearings, the oil-wedge effect is very marked.

The oil-wedge effect between a ball and its races is rather abrupt, as shown at D. Ball bearings present concave and convex surfaces in contact with the outer and inner races respectively. These contacts are theoretically points, but due to the elasticity of the metals, they are actually minute areas.

Like ball bearings, the oil-wedge effect between gear teeth is blunt, as shown at E. The lubricating problem is one of establishing and maintaining an oil film between two convex surfaces. The relative sliding motion between the teeth as they engage becomes an important factor in the formation of the oil film. An analysis of this motion between the teeth shows that it is always directed toward the pitch line of the driven gear and away from the pitch line of the driver, as indicated by the arrows in the figure. The motion, therefore,

reverses direction as the contact passes through the pitch point. This reversal of motion tends to rupture the oil film, as the action is similar to that of a crosshead stopping and reversing its direction of motion at the end of the stroke.

Tooth Loads

In many gears, the ratio is such that one pair of teeth only carry the load when the contact is on or near the pitch point. Hence, the tooth pressure is maximum when the motion is least favorable to oil film formation. Unless the lubricant employed possesses the requisite body or

viscosity to form a film which will not rupture or break down under these adverse load and film-forming conditions, compressive fatigue or pitting of the contacting tooth surfaces is likely to occur on or near the pitch line.

The most recent explanation of pitting is that it is caused by the shearing out of the unsound or imperfect particles of metal. Hence, when all of these unsound particles have been removed, pitting stops, unless of course, the tooth pressure is beyond the fatigue limit of the sound metal. The point is also made that the operation of gears tends to cold-work the

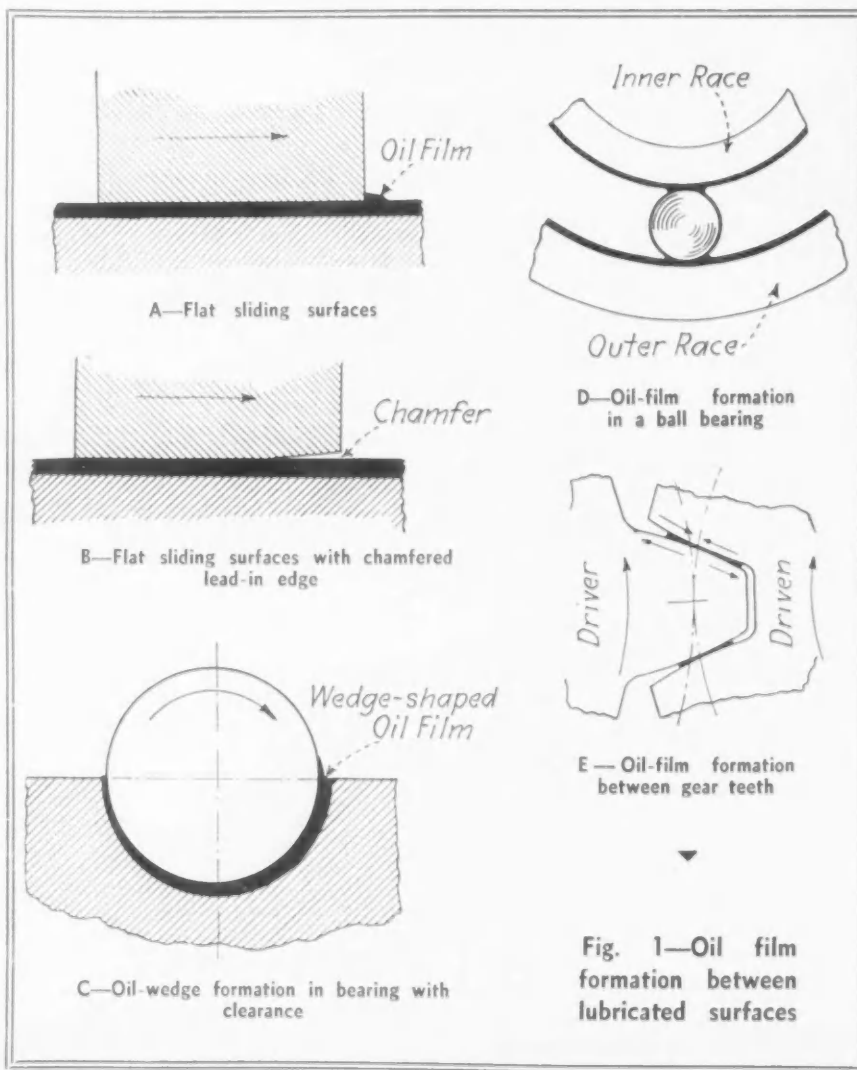


Fig. 1—Oil film formation between lubricated surfaces

surfaces of the teeth, thereby increasing the physical properties of the metal. Hence the stress required to produce pitting on such cold-worked surfaces may be considerably greater than the ultimate strength of the metal in its original state. Pitting, therefore, generally occurs in new gears and usually ceases as soon as the gears become adapted to each other, in other words, "run-in." Such incipient pitting should never be a cause of alarm.

In the gears under consideration, the contact between the teeth is usually spoken of as "line contact." It is, however, in reality over a very small rectangular area, due to the deformation of metal under pressure. Since deformation of metal is limited and the pressure is often intense, destructive local stresses sometimes occur and abrade the contacting tooth surfaces, as shown in Fig. 2. If these surfaces are covered by a tenacious oil film of the correct viscosity, the load is distributed over a widened area, thus reducing the stress intensity.

The fact that loads are as a rule high and that the contact area between gear teeth is small serves to emphasize the necessity of providing a correctly selected lubricant for the service and a proper method of application.

Speed and Duration of Tooth Contact

Speed and duration of tooth contact are other factors influencing oil-film formation and maintenance between gear teeth.

Speed, in the lubrication of gears as well as in bearings and other machine elements, should refer to peripheral velocity and not r.p.m., as, in the case of gears, the centrifugal force tending to throw the lubricant off of the contacting tooth surfaces is directly proportional to the pitch line velocity. Moreover, the relative sliding motion between the teeth and the duration of tooth contact are functions of the pitch line velocity and have a material effect upon the oil-film formation.

Any given pair of mating teeth of small, high-speed gears are in contact during a relatively short period of time, thus having little opportunity to rupture the oil film. On the other hand, mating teeth of large, slow-speed gears are in contact a considerable period of time, and therefore have a strong tendency to rupture the oil film.

When suitable means of application are provided, high speeds and short periods of tooth contact favor the maintenance of an effective oil film over the teeth, and permit the use of relatively light bodied oils. Low speeds and relatively long periods of tooth contact require the use of a lubricant of heavier body that will provide a strong lubricating film to withstand these adverse conditions, which tend to squeeze the oil from the contacting surfaces, thereby permit-

THE problem of the lubrication of gears is here set down in concise terms. In a concluding article will be given a guide to the selection of the proper lubricant for spur, helical, herringbone and bevel gears, tabulated for a wide range of service, from the lightest of machine tools to blooming-mill pinions.

The author, who is assistant professor of machine design at the Virginia Polytechnic Institute, Blacksburg, Va., was until recently technical editor with the Vacuum Oil Co. Previous to that connection he had four years of plant and designing experience and taught for four years in the department of mechanical engineering at Pennsylvania State College.

ting metal-to-metal contact with consequent wear and high frictional losses.

Imperfection of Tooth Surfaces

Perfect tooth surfaces are only attainable theoretically. In practice it is impossible to produce perfectly smooth metallic surfaces, irrespective of the method employed and the time spent to do so. However, with modern precision-gear grinding and lapping machines it is possible to produce gear teeth with surfaces that are accurate within the limits of oil film thickness. Obviously, the expense of manufacturing such accurate teeth is high, and is only done in the most precise machines.

As gear teeth are ordinarily cut, the contact area is not continuous, but is modified such that the load is supported by numerous high spots of microscopic height. Manifestly, such

a condition causes intense local stresses and discontinuous oil films, thereby decreasing the load that can be transmitted by the gears without damaging them.

Inaccuracies of the teeth assume still greater importance in high-speed gears, as the impact of high points causes heavy local stresses in the metal, even when only light loads are transmitted.

Usually such inaccuracies wear smooth in a short time and, in consequence, the gears operate more quietly and are capable of transmitting greater loads. Where such inaccuracies persist, however, it is possible to minimize noise and wear by using a lubricant of sufficient body to form extremely tenacious oil films.

Hardness of Tooth Surfaces

If soft or medium hard gears are subjected to heavy or even moderate pressures and are improperly lubricated, they become noisy, inefficient and wear rapidly, and consequently have a relatively short life.

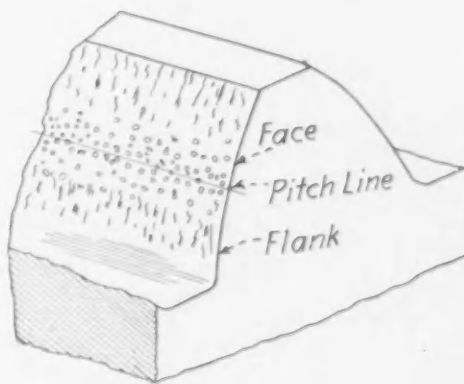
On the other hand, glass-hard gears resist wear, even when subjected to heavy pressures and lubrication is only fair. Their efficiency and life, however, are greatly increased by correct lubrication.

It may be said therefore that regardless of the degree of hardness of the teeth the useful life of gears is greatly prolonged by providing correct lubrication, which combines the selection of a correct lubricant for the service and a proper method of application.

[In a concluding article, Prof. Clower offers a tabulation of the proper lubricants and lubrication for an extended range of applications.]

A. Milne & Co. and Edgar Allen Steel Co., Inc., 741-5 Washington Street, New York, have appointed James C. Brookfield, 715 East Laurel Street, Syracuse, N. Y., as sale representative for their tool steels in New York State and central Pennsylvania.

Fig. 2—Showing effects of excessive load. Note pitting at the pitch line and wiping of the metal along the face and flank



Motion-Time Analysis at the Link-Belt Co.

TIME study first was introduced into the Link-Belt Co. in 1900 under the supervision of Frederick Taylor, Carl Barth, Chris Berg and Dwight Merrick. Their efforts were to compile books of standard times for elementary operations, such as chucking a piece of metal in the lathe, taking a cut with certain speeds, feeds and amount of metal removed and so on. Using these data, it has been possible to take a blueprint, analyze the operations required, look up the elementary times and set a rate which was reasonably accurate for short runs without making any time studies. This was carried out universally through the plant so that the majority of rates were established from standards or graphs.

Motion-time analysis, that is, the act of describing how a job is done in terms of standard motions, the value of which is known, would seem to offer unusual difficulties in an engineering or jobbing shop. Yet, the Link-Belt Co. manufactures almost exclusively to customer's orders and it has very little repetitive work. And motion-time analysis principles and technique were readily absorbed in the foundry, structural shop and machine shop.

Typical Example of the Analysis

The application of motion-time analysis may be explained in the case of stamping the trademark on a 6-in. pitch ice-chain link. These links are handled in quantities of 10,000 each in about eight orders per year. The links vary considerably in size and in quantities. The operation is performed on a 90-ton Ferracute punch press.

The analysis indicated that automatic feed was needed for this operation. Owing, however, to the variety of sizes and quantities, such was out of the question, as the machine has to be used for other purposes and could not be tied up for one class of work.

The old method of dumping the barrel of links on the floor, shoveling them up to a table and then stacking them seemed fairly antique. However, only about 15 per cent of the links are handled in barrels and until the operation was analyzed not much study was given as to whether this procedure was practical or not. In the light of the analysis the get-ready time was relatively so great that it

BRIEF of a paper read by H. C. Robson, Link-Belt Co., Chicago, before the time and motion study group of the Chicago section of the Society of Industrial Engineers.

was regarded as necessary to do something to reduce it.

As there was no hoist of any kind over the machine, and it was not economical to erect one over it, a container was designed to be rolled under a chain type hoist that was hung about 15 ft. from the machine. The operator now hoists the barrel above the container and dumps the contents into it. He then rolls the container over to the machine in line with the tray that feeds the links. By dropping the forward side of the container the links are in the position to be fed into the die. The change reduced the get-ready time considerably.

The operator then picks up the link with his left hand, holds it under the die with both hands and disposes of the finished link into a barrel with his right hand. A motion-time analysis showed that while picking up the link with the left hand, the right hand was idle after the "release load," to speak in terms of therbligs, (as the elements of a motion cycle are called). Both hands were "holding" when the link was under the die or the "use" was taking place. The "put away," or disposing of the link, it was indicated, should be taken care of with a drop chute or some method that does not take a chargeable time.

Reduces Accidents and Promotes Safety

The new method established by the studies introduced a safety factor. The man's hands are not near the die at any time. Good motion-study practice, it follows, reduces accidents and promotes safety. This was partly the reason the Link-Belt Co. won two plaques from the National Metal Trades Association, and the Chicago Safety Council for the lowest accident frequency rate from Jan. 1, 1932, to June 30, 1932.

Here, in part, is the new method, together with a diagram of the therbligs: Starting with the left hand the fingers "grasp" the link in the container while the right hand is "positioning" the link to the guide. Next is a "transport loaded" and "pre-position" with the left hand and a "release load" and "balancing delay" on the right hand. While the left hand is performing this motion there is an "inspection" operation that takes place with the fingers. On the analysis it specifies that the burred edge must be up. This inspection is performed while the hand is transport loading, and the link is turned over if necessary.

Next is a "position" with the left hand and a "transport loaded" and "balancing delay" with the right. Then a "transport loaded" and "balancing delay" with the left hand and a "grasp" with the right hand. Next a "transport loaded" and "balancing delay" with the left hand and a "transport loaded" and "pre-position" with the right hand. Next a "position" and "balancing delay" with the left and a "position" with the right. Then there is a "release load" and "balancing delay" with the left hand and a "transport loaded" with the right hand. Next a "transport empty" with the left and an "unavoidable delay" with the right hand. Then a "transport empty" with the left hand and a "transport loaded" and a "balancing delay" with the right hand.

This completes a cycle of two links finished, or the "do" position. The "put away" is taken care of by itself. The links drop off the slide into a barrel.

Results of Preliminary Survey

On a preliminary survey in the machine shop on planers, vertical boring mills and horizontal boring mills, it was brought to the attention of the management that 68 per cent of the total time on operations is actual machine or used time. This meant that for 20 min. of each productive hour, on this class of machine tools, the operators are available for other work.

Tangible savings from this survey developed that one operator could operate two 34-in. King boring mills.

The operator on the shaft lathe could operate the cylindrical grinder and the lathe for deep hole drilling, making a combination of three machines. On some of the machines the operators were given bench work, laying out work and inspection work to perform while their machines were operating.

From the data obtained, a permanent classified record has been built up, so that there is no duplication of effort on the part of the motion time analyst. The Link-Belt Co. is gradually compiling a handbook of standard motion times that will be interchangeable between plants of allied manufacturers. In fact, standard times have already been exchanged with another organization.

What Motion-Time Studies Achieve

Experience with motion-time analysis leads to the following conclusions:

1. A permanent record is made of the correct motions necessary to perform any operation. From this record the necessary tools, fixtures and machines can be ascertained.

2. Improvements on operations are more clear cut and can be set up on a systematic basis. Cooperation from the workers is made possible by the establishing of accurate standards and rates.

3. The responsibility for making rates is definitely up to the supervisor and motion-time analyst.

4. Because motion-time analysis gives a definite set of motions to be performed, the transfer of skill from one operator to another is accomplished more easily.

5. Motion-time analysis does not interfere with old established rates, as the improved method is so clear cut that changes are readily accepted. Rates established from motion-time analysis can be set up so that the worker's earnings are not decreased, but production increased and costs reduced.

6. The training of supervision in motion-time analysis results in improvements before the job is analyzed. This accomplishes large savings in time and cooperation with the time-study department.

7. Motion-time analysis and equipment formulated in one department can be readily used in other departments, with definite assurance that the time established will work elsewhere. This is accomplished by the detailed descriptions of conditions and motions which would otherwise be slightly different on account of difference in methods and opinions of the individual and foreman.

8. Time-study men analyze an operation in terms of balanced motions instead of elemental operations, as in time study.

9. There are no exceptionally fast workers and slow workers. When the correct motion path has been set up and the operators trained to follow the analysis, they all work on an equal basis. This will be proved by analyzing a fast worker's performance. It will be noted that his or her motions will compare favorably with the motion path established.

10. Motion-time analysis is not a cure-all but it has, however, been proved that it is a constructive means of definitely controlling direct labor costs.

Therbligs in a Stamping Operation

THIS chart is intended to show the time consumed and distance covered during fundamental motions when stamping ice-chain links. In such analysis the cycle of motions is divided into therbligs, so called, of which the symbols and descriptions are as follows:

Symbol	Therblig
T. E.	Transport empty
T. L.	Transport loaded
C. D.	Change direction
G.	Grasp
H.	Hold
R. L.	Release load
P. P.	Pre-position
P.	Position
I.	Inspect
S. E.	Select
S.	Search
Pl.	Plan
A. D.	Avoidable delay
U. D.	Unavoidable delay
R.	Rest
U.	Use
A.	Assemble

Transport Empty—is the act of moving a transportation means without load or resistance.

Transport Loaded—is the act of moving transportation means against load or resistance.

Change Direction—is the act of varying the plane through which a transportation takes place, or of varying the means of transportation without a definite stop intervening.

Grasp—is the act of obtaining control of anything.

Hold—is the act of maintaining control of anything.

Release Load—is the act of relinquishing control of a piece.

Pre-position—for the next operation is the act of preparing either the transportation means or the item transported for the next operation that is to take place.

Position—is the act of placing one thing into an exact and predetermined relation to something else.

Inspect—is the act of examining anything for any desired characteristics.

Select—is the act of determining which of a choice of items in a known location most nearly fits your specifications.

Search—is the act of determining where anything is located.

Plan—is the act of determining a course of action.

Avoidable Delay—is the delay which is under the control of the operator.

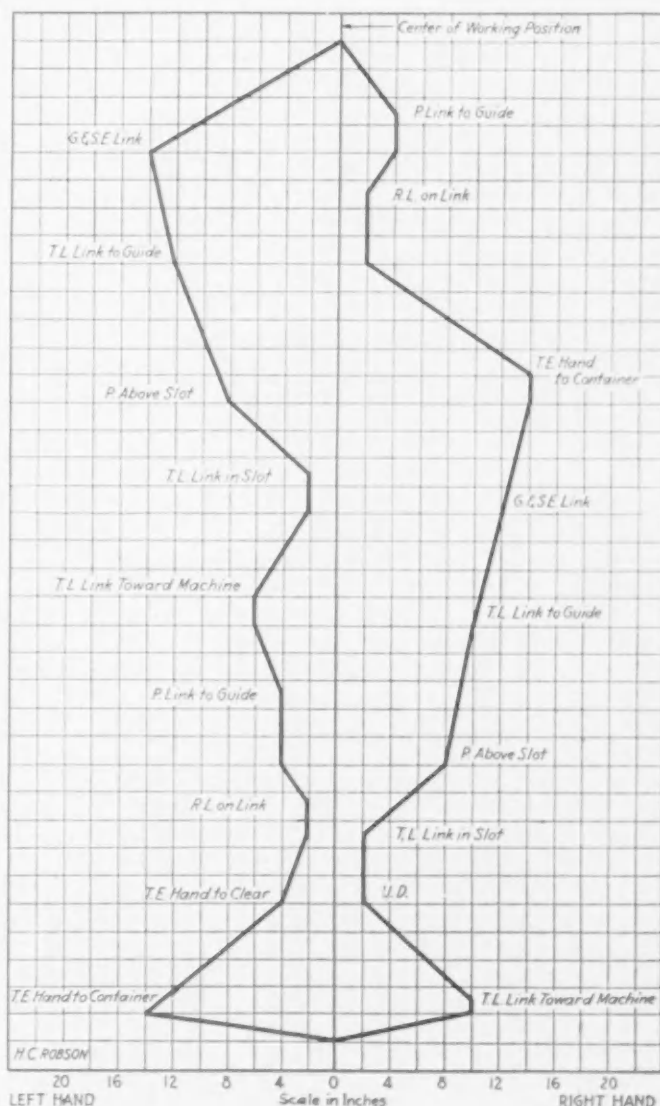
Unavoidable Delay—is the delay in the operation which is beyond the control of the operator.

Rest—is for overcoming fatigue and is that delay occasioned by the necessity for the body to recuperate after a certain amount of exertion.

Balancing Delay—is that delay caused by the nerve limitations of the body.

Use—is the time required to complete a mechanical or physical process.

Assemble—is the designation used to cover a complete cycle of motions generally used for putting two or more things together.



Putting the Question Mark to Work

Tungsten Carbide Tools

We have had difficulty getting tungsten carbide tips to hold to the tool shanks in cutting cast iron. Do others have this same difficulty?

A. M. H.

WE have developed a new brazing process for cemented carbide tools which we think is an improved method of attaching tips of this material in various designs to the usual steel tool shanks. Our experience shows that the bond between the tip and the shank, when joined by this new process, is several times stronger than that produced by the usual method of copper brazing. We call this new method the Z-Foil process. It gives the added advantage of obviating the necessity of dovetailing in many cases. Radical changes in tool design are now possible and tools intended to cut in several directions need not have the elaborate steel backing which is required at present.

Thomas Prosser & Son

An Inhibitor for Muriatic Acid

Can you suggest a satisfactory inhibitor which can be used for muriatic acid in pickling?

W. L. Hults.

WE have experimented with 25 or 30 different kinds of inhibitors and with the exception of one we have not found any to be satisfactory with muriatic acid. The one that has given satisfaction is a compound of thiourea with possibly a foam compound added thereto and the action in pickling wire is very good in that the surface of the wire is not pitted and there is very little hydrogen embrittlement. This latter property is of value in pickling very fine wire which is made brittle easily if the pickling operation is not handled correctly. All other inhibitors tried with muriatic acid slowed up the time of pickling to at least three times the usual period.

John A. Roebling's Sons Co.

Pickling Stains

We have had difficulty with water stains or discoloration after pickling, which affect subsequent tin plating of steel sheets.

C. H. Cuniffe.

WE build equipment for scrubbing and drying sheets to prevent water marks in the annealing or tinning processes and we believe this will overcome the difficulties referred to by C. H. Cuniffe.

Broden Construction Co.

HOW can I re-tin milk cans? What intensity of light is best for machine tool operation? How much fuel oil should an open hearth furnace burn? Can malleable castings be nitrided? These are a few of the questions submitted recently and which will be answered on this page in early issues. Please address your questions or comment to Forum Editor, Iron Age Publishing Co., 239 West 39th Street, New York City.

Melting Scrap Cast Aluminum

We have had trouble melting up scrap cast aluminum to produce small pulleys and other similar products. At times the metal becomes tough and hard to work and at other times everything is satisfactory. We are using a cast iron pot for melting and another cast iron pot for pouring.

C. T. M.

ONE of the chief factors would be the presence of iron in the scrap, such as might be found in old die castings. Aside from this, iron might be picked up from the melting pot. This could be guarded against by cleaning the pot frequently and coating internally with a whitewash. Another possibility is that the melt is being made viscous by an excessive quantity of entangled oxide. To remove this the melt should be fluxed with a small quantity of zinc chloride which should be stirred well into the metal with an iron tool. The dross which forms should then be removed.

L. M.

High Creep Strength Alloys

Can you suggest a material which will have high creep strength at high temperature and at a centrifugal stress of close to 80,000 lb. per sq. in.?

E. H. B.

AUTHORITIES which we have consulted feel that there is no material which would resist such a high stress without a creep of more than 1 per cent in 10,000 hr. One company which we consulted stated that it is now using an alloy containing 22 per cent nickel and 8 per cent chromium which shows a creep strength of about 20,000 lb. for 1 per cent flow in 100,000 hr. at 1000 deg. F. This company reports that a 12 per cent chromium, 3 per cent tungsten alloy, which they have tried, gives a creep strength of 21,000 lb. for a flow of 1 per cent in 100,000 hr. at 840 deg. F.

R. T.

Painting Galvanized Iron

(Editor's Note) Several manufacturers have asked this department about painting new galvanized iron in production work and we are therefore glad to present the following announcement.

WE have recently published a small booklet entitled "The Painting of Galvanized Iron." This presents a detailed treatise on the subject, outlining the cause of difficulty and suggesting corrective procedure. Some of the conclusions at the end of the booklet are as follows:

1. Zinc surfaces need pre-treatment when most priming paints are used.
2. Priming paints are available, which give satisfactory results on treated or untreated zinc surfaces, assuming that the latter are dry and clean.
3. Sand blasting or sufficient natural weathering gives good results with any paint.
4. Chemical etching is less effective but has the advantage of being quicker than weathering and less costly than sand blasting.

New Jersey Zinc Co.

Forging Stainless Steel

We have a call for 8-in. roll forgings of stainless steel and as this is new material to us we would like to know the forging technique.

A. F. C.

OUR procedure in forging stainless steel changes at about the size referred to: For smaller work we heat quickly to from 2000 deg. F. to 2100 deg. F. and endeavor to finish our forging above the 1700 deg. F. level. For larger work we pre-heat and soak at 1500 deg. F. then raise the temperature rapidly to about 2050 deg. F. and do not soak at the higher temperature. We are careful to have the first blows of the hammer light. This we feel is important and often difficult to obtain, especially on piece work.

L. S. C.

Nitriding Castings

Can we put a hard case on castings by nitriding in the same way as we are now nitriding forgings and rolled metal parts?

W. L. H.

YES, provided the castings have the proper composition. The hardness-depth curves for chromium-vanadium steel castings are the same as those for the rolled material. "Nitricastiron," as nitrided cast iron is called, shows a hardness comparable to that of Nitralloy. The Nitralloy Corp.

Large Gears Are Machine-Molded

LARGE cast smooth-running gears furnish an example of the highest type of foundry art, for even an experienced molder cannot produce a smooth-running gear without the cooperation of the pattern maker and the metallurgist. The Link-Belt Co., at its Caldwell-Moore plant in Chicago, is now producing unusually large gears by the machine molding process, and while the method itself is not new, it has been coordinated with new features which may not have been heretofore applied to such large work.

A spur gear mold in process is shown in Fig. 1. Here all the teeth are molded from a tooth block for a single tooth space. The spacing of the tooth block in the preparation of the mold is done with an indexing mechanism, using gears in exactly the same way as the teeth of a cut gear are spaced. The tooth space or pat-

tern is made without draft, so that it will mold a tooth of the same cross-section throughout. This introduces the difficulty of withdrawing the mold without disturbing the surface of the molded tooth. The problem has been solved by using an accurately cut stripping plate and having the molding sand of just the right consistency.

After the teeth have all been formed in this way, the mold itself is completed in the usual manner by introducing the cores and fitting the cope in place. A complete mold ready to close is shown in Fig. 2. The work is facilitated by using specially designed metal flasks which are machine-finished top and bottom and which have holes drilled to gage so that they match perfectly and are interchangeable. This automatically insures the correct centering of the core and a uniform thickness for the rim. In fact, it is due to this feature

of machined flasks that the production of gears for high-speed work has been possible. In the regular day-to-day production, the castings need only to be snagged for balancing, leaving the surface of the teeth untouched.

For wearing qualities this type of gear with the skin of the casting left intact exceeds the usual cut tooth gear where the softer interior metal is exposed.

Gears 14 ft. in. diameter have been made in the Caldwell-Moore foundry, with a variation in diameter of less than $\frac{1}{8}$ in. Bevel gears are made on a somewhat similar molding machine, illustrated in Fig. 3. Here, because of the shape of the gear, it is possible to give the tooth form a draft, which facilitates withdrawal after molding.

After the gears have been completed they are put on a testing frame and checked up for accuracy with other gears.

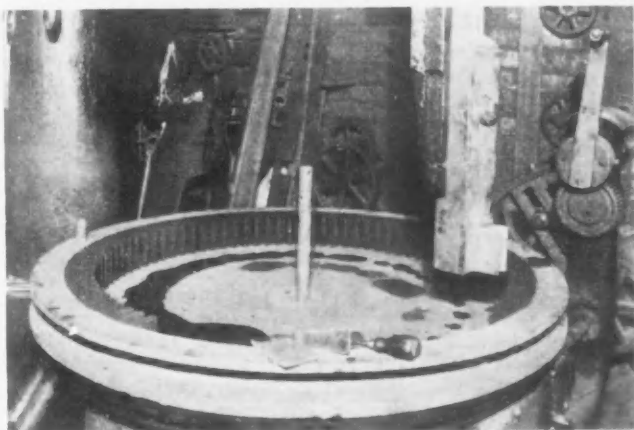


Fig. 1—Large gears are accurately machine-molded with an indexing tooth form



Fig. 2—Specially designed and accurately machined metal flasks make balanced gears possible



Fig. 3—Bevel gears are made on a similar indexing machine

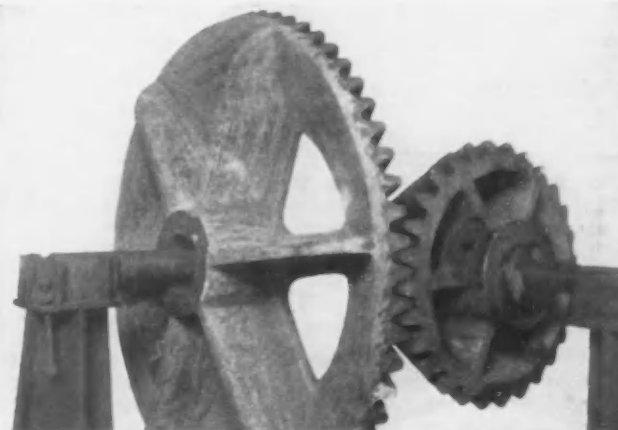


Fig. 4—Gears are checked on rigid test frames before shipping

Marketing Problems Discussed By Management Association

Industrial Distribution Analyzed by Executives at
Pittsburgh Meeting

INCREASED executive emphasis now being placed upon the sales problems of the metal-working industry was reflected in both title and subject matter at the Industrial Marketing Conference of the A. M. A. held in Pittsburgh on December 5 and 6. The meeting was under the direction of C. J. Stilwell, vice-president, the Warner & Swasey Co. It was significant in marking the application of the high powered executive microscope to the present and impending sales problems of the industry as affected by altered economic conditions.

"What selling needs today is a good old evangelistic revival," said Frederick B. Heitkamp, general sales manager, Cincinnati Milling Machine and Cincinnati Grinders, Inc., in an address on the subject of "Industrial Sales Management for Present Conditions." "The spirit which causes men to do better than they believe possible seems to be lacking and needs to be brought back."

When a company is confronted with a problem of knowing whether it is profitable to keep members of its sales force on a part time basis or materially to reduce the number of those employed, Mr. Heitkamp indicated that, except in rare cases, it is highly improbable that the part-time idea can be followed with success. "It is probably better to reduce the sales force and increase the size of territory covered by the men," Mr. Heitkamp said. "To keep a man on part time tends to break down his morale, because it is frequently impossible for any one of the men to make a satisfactory financial showing."

In discussing the matter of salary for salesmen, Mr. Heitkamp said that, at present, base salary with commission is probably the most satisfactory method of compensation. "Due to the ups and downs in the sale of industrial equipment," he continued, "it is for the best interest of the men as well as for the company to have a base salary, which under ordinary conditions will carry them through thick and thin. The commission gives an incentive, and if properly arranged will take care of the advance in salesmen's compensation with the upturn in business. This probably will insure the maximum effort."

Methods of effecting savings in selling expense which Mr. Heitkamp mentioned included the following: Elimination of branch offices; reduction of personnel; reduction of straight salaries; reduction of rent; elimination

of promotional expense not directly productive of results; closing up or leasing of warehouses; reduction of traveling expenses; elimination of entertainment expenses; reduction of clerical staffs in home office; lessening the amount of free service; reduction of automobile allowances.

Mr. Heitkamp believes that more extensive marketing research is justified at the present time. "It should pay big dividends as the business curve moves upwards," he said. "A company can no doubt go to extremes in marketing research," Mr. Heitkamp continued, "but on the other hand this activity should be extensive enough so that, before any move is made, a clear idea is secured in advance as to results that can be expected."

Pricing Policies During Depression

H. S. Beal, manager, Jones & Lamson Machine Co. and president, National Machine Tool Builders Association, called attention to the complete connection between price and volume in the machine tool business. "Machine tools are primarily labor savers," said Mr. Beal. "They are bought as capital investment to make possible the elimination of labor or its more effective use. When looked at from this angle, it is apparent that the price which machine tools can be sold for, absolutely establishes the volume of business which will be available. Price is just as surely a controlling factor in relation to the possible volume of machine tool business as it is in consumer goods although the connection is not so apparent."

In his address Mr. Beal stressed two main points: First, that the "one price" policy is a most effective and efficient one for the equipment industry and is of great enough value so that every effort should be made to preserve it. Second, that equipment prices must be varied somewhat in relationship to the current value of the dollar. They should properly be increased in times of boom when the dollar decreases in value and decreased in times of depression when the dollar increases in value.

Free Service in Industrial Sales

"The performance of free service has increased greatly in recent years, due to the creation of technical staffs as an adjunct to the sales department and to the direct addition to the sales manager's staff of 'sales engineers', for whose service a charge is rarely, if ever, made," Mr. J. H. Macleod, vice-president, the Hinde & Dauch

Paper Co., said in an address on the subject of "The Trend Toward Expansion of Free Service in Industrial Sales."

"This free service problem presents itself both in promotional work in advance of a sale and in following up a sale with various forms of service without charge to the customer. In nearly every line of business, abuses have developed either through over-zealousness on the part of the salesman or lack of ethical acceptance on the part of the customer. At the same time, free service, both before and after the sale, if handled by the sales executive conservatively and firmly, can be used profitably both in sales promotion and in increasing good-will after the sale has been completed."

In Mr. Macleod's own company, the Hinde & Dauch Paper Co., when an engineering service is undertaken or intricate designs are created the company has a tacit understanding in advance between the salesman and the customer that the company will be given the business for at least a year at its price, if the company is able to effect an economy or create an acceptable design.

"In the many instances where free service of this sort is regarded as a valuable aid to selling and something which the manufacturer is quite willing to stand himself," Mr. Macleod went on to say, "the cost should be charged either to advertising or to sales promotion, in either case being regarded as a cost of marketing. In our own company, we allocate these charges, both those incurred in advance of the sale and after the sale has been completed, to sales promotion, which we try to hold each year within a reasonable sum in direct proportion to our total sales."

Making Industrial Sales Now

"How to Make Industrial Sales Now," was the subject presented by Herbert P. Bailey, assistant to president, the Warner & Swasey Co. His address, which outlined the relation between the net profits arising from the determination of net profits and the equipment sales problem, was printed in full in the Dec. 8 issue of THE IRON AGE.

Mr. Bailey emphasized the fact that today those who buy industrial equipment buy in order to reduce the cost of existing production. This is in contrast to the major motive of the years 1928 and 1929, during which buyers were stimulated to consider ways of increasing production.

"Today our selling presentation should visualize in facts and figures the opportunity for the customer to realize net profits from the purchase of our equipment to reduce costs," Mr. Bailey said. "Our sales presentation must face the fact that the scale of production of our customers is low, and hence our net profit summary must reflect accurately the results

which will be realized under the actual shop conditions of the customer.

"In order to overcome the existing financial resistance to buying," Mr. Bailey continued, "our presentation should summarize the fact in the form of the percentage of net profits to be expected from the investment. This is the language of the treasurer, and the only basis on which he will release cash for investment in fixed assets. The selling process today must be broadened to carry the sales presentation through the factory executive to the treasurer and chief executive, and the sales should, therefore, contain all the facts necessary for a decision by each of these executives, inasmuch as equipment buying is definitely controlled by the chief executive in con-

sultation with the treasurer.

In the discussion of Mr. Bailey's paper, Bernard Lester, assistant sales manager in the industrial department of the Westinghouse Electric & Mfg. Co., urged a closer alliance between makers of kindred equipment. He saw no reason why producers of machine tools should not cooperate with the makers of electrical equipment for these tools, and thus share in sales effort. He said the salesman should be an integral part of the industry he served, rather than of the company only, and this idea seemed to be widely approved. W. J. Donald, formerly managing director of the Association, went so far as to suggest that future mergers might be determined along these lines.

Need for Better Distribution Methods Emphasized

Scientific Study of Marketing Is Urged by Speakers at Annual Meeting of Taylor Society

THE need for developing scientific distribution was emphasized at the annual meeting of the Taylor Society, held in conjunction with the Society of Industrial Engineers and the American Marketing Society at the Hotel Pennsylvania, New York, on Dec. 7, 8 and 9.

That the use of science in production management has far outdistanced its use in sales administration during the past decade summarized several feature addresses at the three-day conference. This disparity was stressed particularly by James D. Mooney, president, General Motors Export Corp., who told the society that imperfect control of the relationship between production and distribution is the chief weakness of American industry. "We have gone aggressively into the erection and equipment of plants," he declared, "without a very coherent idea of the fundamental relationship between these production facilities and the market they might serve to economic advantage. . . . We need an exploration of the implications of the economic extent of the market geographically, dependent upon the character and complexity of the product, the inert value of the product and the amount of specialized tooling for its production."

Mr. Mooney assailed the dogma of the "technocracy" group of engineers that increased unemployment attends technological progress. Solution of current problems, he pointed out, would not come from socialized national planning or from any "super-man," but from free play of economic forces and integration of individual opinions. In conclusion, he urged the

society to accept as its central point of interest proper industrial planning and the study of economics of distribution.

Sees Lack of Standardized Distribution Methods

That development of scientific distribution has lagged far behind progress in production methods was deplored also by Sanford E. Thompson, president of the society. Basing his statements upon a survey of 50 national industries, he declared that, while some concerns are attempting to deal scientifically with selling problems, there is a notable lack of standardized methods in this field. Supplementing the urgent need for scientific distribution is the need for controlling investment and credit, he contended, if the present social order is to be preserved. The belief that consumptive capacity in the United States has reached its peak was characterized by Mr. Thompson as a "most dangerous philosophy." Progress, he asserted, depends upon increased unit productivity.

A 10-point program for business was submitted to the society by Harold V. Coes, of Ford, Bacon & Davis, Inc., New York, who advocated development of measures for stabilizing employment and for maintaining purchasing power and the economic security of workers. Referring to prevailing management policies, he stated that most manufacturers are utilizing their surplus or cash resources in either of two ways: (1) "They are trying to carry on while waiting for something to happen, hoping their conditions will soon be better and that business will come

back with a rush; or (2) they are accepting conditions as they are and are making an investigation by carefully and thoroughly preparing for the future through carefully developed programs for new products, redesign of existing products, and replacement of obsolete equipment, obsolete plant layouts, obsolete methods, obsolete processing, obsolete selling, distribution methods and processes."

Simplified Management Technique Commended

Simplified management technique was held to be a requisite for industrial success by D. R. Stevens, vice-president, Okonite Co., Passaic, N. J. Greatest efficiency, he declared, lies at the present time in the smaller plants. The comparatively simple set-up of the smaller industrial plant, according to Mr. Stevens, facilitates the handling of labor and organization problems and the application of scientific management methods.

Other topics discussed at the various sessions of the conference included unemployment problems of the individual, by E. Hayden Hull, New York; a plan for financial security of employees, by Ralph S. Westing, New York; marketing costs, by Frederick M. Feiker, director, Bureau of Foreign and Domestic Commerce, Washington, and control of the monetary system, informally presented by Professor Hastings of Yale. A symposium dealing with the problem of purchasing power, based on articles in the October, 1932, issue of the *Bulletin* of the Taylor Society, concluded the meeting.

At the business session, Mr. Thompson was reelected president of the society; Walter D. Fuller, vice-president; Edward W. Clark, treasurer, and Fessenden S. Blanchard and Willard E. Hotchkiss, directors. Dr. H. S. Person was reelected managing director.

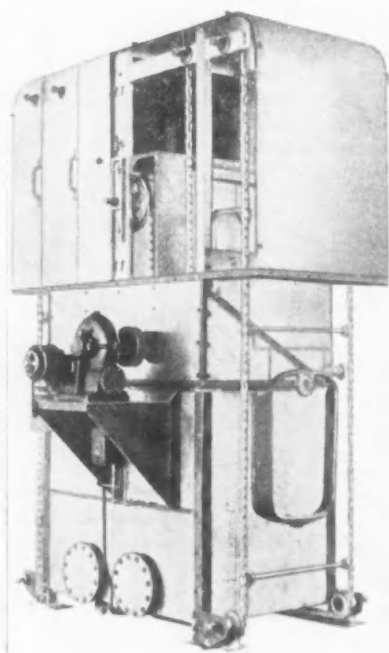
Scrap Iron Club of Philadelphia Organized

Scrap dealers and brokers in the Philadelphia district have organized an association tentatively called the Scrap Iron Club. The officers are: President, Furman Mather, Frank, Samuel & Co., Inc., Philadelphia; vice-president, W. L. Forebaugh, Luria Brothers & Co., Inc., Philadelphia; secretary, George I. Stout, Luria Brothers & Co., Inc.; treasurer, John Hunt, M. J. Hunt's Sons, Philadelphia.

Virtually all scrap firms in the Philadelphia district are members of the club. It held its first meeting Dec. 7 and discussed future policies and other matters of interest to the trade, which has organized for its mutual benefit. The meeting was one of the most largely attended of any ever held by scrap dealers in the Philadelphia district.

Automatic and Hand Dip Metal-Parts Degreasing Machines

A LINE of degreasing machines for cleaning metal parts prior to plating, painting, enameling and lacquer finishing, assembling, etc., is being marketed by G. S. Blakeslee & Co., Nineteenth Street and Fifty-Second Avenue, Chicago.



These machines, the American and Canadian rights to which have been acquired, employ a chlorinated solvent designated commercially as Blacosolv. They are made for either hand dip or automatic handling. The types of machines offered by the company include a hand power dip unit, especially adaptable for quick degreasing of metal parts between operations; an automatic motor driven dip machine for handling small, massed articles in baskets; a semi-automatic motor driven unit for cleaning mass production as well as for large, individual pieces; a specially constructed dip metal degreaser for iron rings, bands, tires, etc., provided with hydraulic arrangement for dipping, turning and shaking, with swinging post; an automatic conveyor model for degreasing corrugated material and large, heavy parts in baskets.

The method of operating these machines is invariable, whether hand or automatic type dip is used. The parts are immersed directly in the solutions; or are put through in baskets, rotating or stationary, as for hollow pieces; or are straight dipped, as for radiator shells prior to chromium plating. The machines also provide for removing chips, dirt and other insoluble matter.

The unit illustrated is for automatic degreasing of large, single

pieces, such as refrigerator parts, radiator shells, etc., which must be degreased thoroughly. The parts to be cleaned are suspended from the cross bars of the conveyor at one end and may be removed on the other end. As in all Blakeslee degreasers, the clean distilled solvent flows into the rinse; then overflows to the washing arrangement. Cooling coils at proper levels prevent escape of vapors, which are condensed. A blowing system eliminates any possible odors. The capacity of this model is 90 pieces an hour.

Marion 18-cu. yd. Dipper is Counterweighted

A COUNTERWEIGHTED dipper is a new feature of an electrically operated stripping shovel, one of the largest ever constructed for open pit mining, that was built recently by the Marion Steam Shovel Co., Marion, Ohio, for the Clemens Coal Co., Pittsburg, Kan. The dipper has a capacity of 18 cu. yd. The counterweight is provided to counterbalance the weight of the dipper so that the power developed by the motors may be used for actual digging.

The counterweight moves vertically between guides on the rear of the

upper frame and it is connected through a cable to the hoisting drum. When the dipper is hoisted the counterweight lowers, thus aiding the hoisting motors. As the current used when either hoisting or lowering is reduced, a larger dipper may be used without increasing the size of the motors.

The counterweight consists of a structural steel box filled with ballast and fitted with a large drum geared to pinions at each side of the counterweight, these pinions engaging with vertical racking, fastened to the supporting structure so that the counterweight travels up and down as the drum is revolved. A single cable connects the counterweight drum with the hoisting drum. An automatic safety device prevents the counterweight from dropping in case the hoisting or counterweight cables should break.

The shovel has a 95-ft. boom and the over-all length of the dipper handle is 63 ft. 5 in. Its maximum dumping height is 70 ft. and its dumping radius is 102 ft. 9 in. It has six motors for hoisting, rotating, crowding and driving, ranging from 125 to 800 hp. The dipper is large enough to permit a 7-passenger automobile to be driven through it. The shovel has a capacity for digging 30,000 cu. yd. of dirt in 24 hr., or enough to fill 7500 motor trucks each carrying 4 cu. yd. With its long reach it can dig a dipper full of dirt, rotate and dump it 200 ft. away on the top of a six or seven-story building.



This shovel has capacity to fill in 24 hr. 7500 motor trucks, each carrying 4 cu. yd.

Diamond Boring Machine for All Types of Transmission Gears

SIMULTANEOUS boring of work from opposite ends is accomplished by the Duobore diamond boring machine recently placed on the market by the City Machine & Tool Works, Dayton, Ohio. The machine has been built especially for all kinds of transmission gears. When used on single-bearing gears two gears are set up and bored simultaneously.

The machine is equipped with two Bolender gear chucks which are carried in a substantial housing and accurately aligned with each other. Boring spindles feed forward through the chucks. They are made short to preserve accurate alinement and freedom from whip, are mounted in ball bearings, and connected to their driving shafts by universal couplings. Each spindle is driven by an electric motor. A third motor, under the machine, actuates cams which feed the spindles to the work and withdraw them after the boring has been completed.

In boring a cluster gear with double-end bearings, the operator slips the gear into the chuck at the left and with the capstan wheel advances the right-hand chuck to engage the opposite end of the gear. He then pulls a lever to open a valve that causes the two hydraulic cylinders to simultaneously close the two chucks. When the valve lever is moved down, it exposes an electric starting button, which the operator pushes to start rotation and feeding of the spindles. An electric signal light shows when the spindles have left their idle position.

Upon completion of the boring, an electric trip automatically stops the spindle motors and applies electric spindle brakes. The motor that actuates the feed cams continues running until the spindles have been withdrawn from the work. The operator

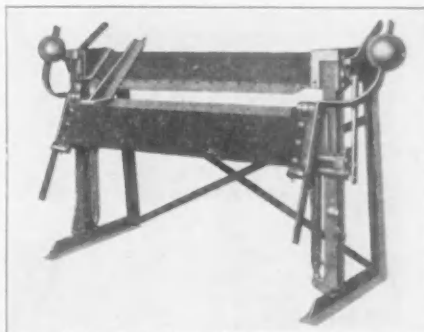
then releases the chucks and removes the finished work.

When the machine is used for boring single-bearing gears, the right-hand chuck remains permanently in its "return position."

Dual-Purpose Bending Brake

A NEW hand-operated bending brake that may also be used as a box or pan brake has been placed on the market by the Whitney Metal Tool Co., Rockford, Ill. It is stated the changeover from one type of machine to the other can be made in 10 or 15 min.

In this machine the platen, or member against which the material is held for bending, is stationary—an arrangement said to result in accurate work and make possible the producing of very square corners. The lower



portion of the clamping rail and bending apron slides on the two end posts, and the weight of the lower mechanism is balanced by two coil springs. This, it is stated, relieves the operator of any lifting of the lower mech-

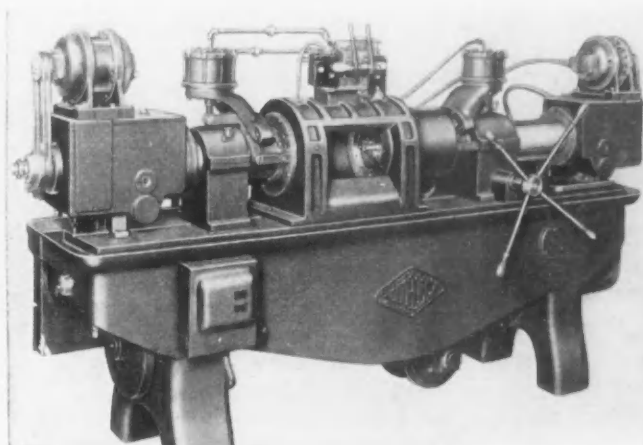
anism. The machine is equipped with a box finger at the right-hand end, and by attaching various fingers to the platen any desired pan or box within the capacity of the machine can be made. The so-called stationary platen can be moved backward by means of screws provided for the purpose; this adjustment is made to assure proper alinement with the bending apron. Up-and-down movement of the lower bending rail is actuated through links at each end of the machine. These links may be set at either of two positions—upper and lower—according to whether the machine is to be used as an ordinary metal brake or as a box or pan brake. The brake is of sturdy construction and most parts are made of steel. It has capacity for material up to and including No. 16 gage.

New LeBlond Engine Lathe

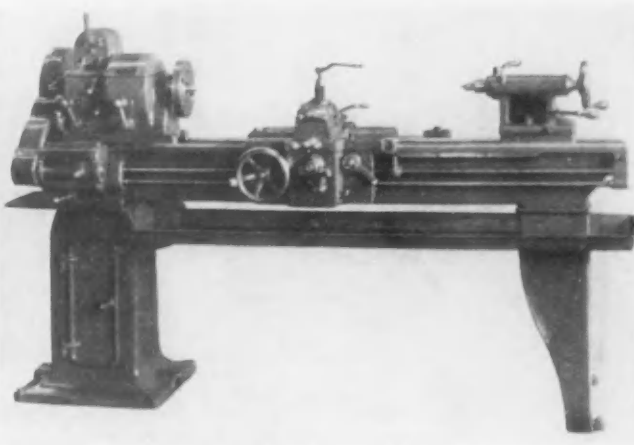
THE R. K. LeBlond Machine Tool Co., Cincinnati, has brought out a "Super Regal" engine lathe, featuring simplicity of control and automatic lubrication. It is built in 12 and 14-in. sizes.

In addition to the gears that give eight selective speed changes, the feed reverse and feed compounding gears are located inside the head, eliminating tumbler gears and swinging plates on the end of the lathe. All gears are of steel, heat-treated and normalized.

All controls are centralized. The apron is a double-walled one-piece casting in which all moving parts run in oil, and the rack pinion and hand-wheel roll on ball bearings. A plunger pump in the apron reservoir lubricates the carriage, cross-slide ways and the cross-feed screw bearings. One safety interlocked trip lever controls both carriage cross-slide movements. The motor is mounted on a hinged plate on the rear of the leg, and the drive is by V-belts.



Gears can be simultaneously bored from opposite ends. Single-bearing gears are bored two at a time



Centralized control and automatic lubrication are features of this lathe. The motor is mounted on a hinged plate at the rear

Flexibility Features Oil-Feed Drilling Machines

TWO horizontal oil-feed way-type drilling machines have been brought out by Baker Brothers, Inc., Toledo, Ohio, to complete the company's series of three machines of this design. The unit here shown is the largest of the series.

Simplicity of design, with use of standard parts or units wherever possible, and flexibility in respect to changeover to other work have been major aims in this design.

Standard saddles are mounted on each end of the machine, and these have drive brackets for the multiple-spindle heads. The heads are mounted on the front faces of these drive brackets, an arrangement that facilitates changing to new heads. The bed of the machine is made long to accommodate work of various lengths. Each end of the machine has its own oil-feed unit, and has the Baker Twin-Pull feed with two cylinders out in the open for quick adjustment. All oil lines are also accessibly mounted so that any leakage may be quickly located.

All machines are arranged with automatic cycle, started by means of the foot treadle at the front. Cycle control trip blocks are located accessibly on the saddles. The feed can be changed through the two metering valves, one at each end, by moving a lever. A pump on each drive bracket provides automatic lubrication to all bearings and gears in the head. The spindles are mounted in ball bearings, and provision is made in each spindle end for in-and-out adjustment for setting tools. Clamping of the work is accomplished by means of oil.

The machine illustrated, the No. 8-HH, is set up for drilling 16 valve holes in an eight-cylinder motor block. Two other machines of this design were purchased by the same user. The second machine is used for

a second boring of the valve holes, and the third machine for the final reaming operation. The weight of the machine shown, with fixture, is 17,000 lb.

Gas-Driven Trailer-Type Arc Welder

THE shunt induction principle for arc stabilization is used in a 300-amp. gas-driven portable trailer-type arc welder brought out by the Universal Power Corp., 12367 Euclid Avenue, Cleveland, for field use in structural steel erection, pipe line work and general maintenance work. The power unit is a Ford V-8 motor. The combination of the shunt inductor and the smooth flow of power assures, it is claimed, unusual stability and flexibility, provides higher efficiency and greater metal deposit and reduces fatigue of the operator.

The radiator and a blower-type fan are mounted parallel with the motor. There is a sliding cover over the radiator to allow the proper amount of radiation and cooling regardless of weather conditions. The arrangement of the radiator and fan and the use of a short generator provide a small, compact unit. The welder is said to

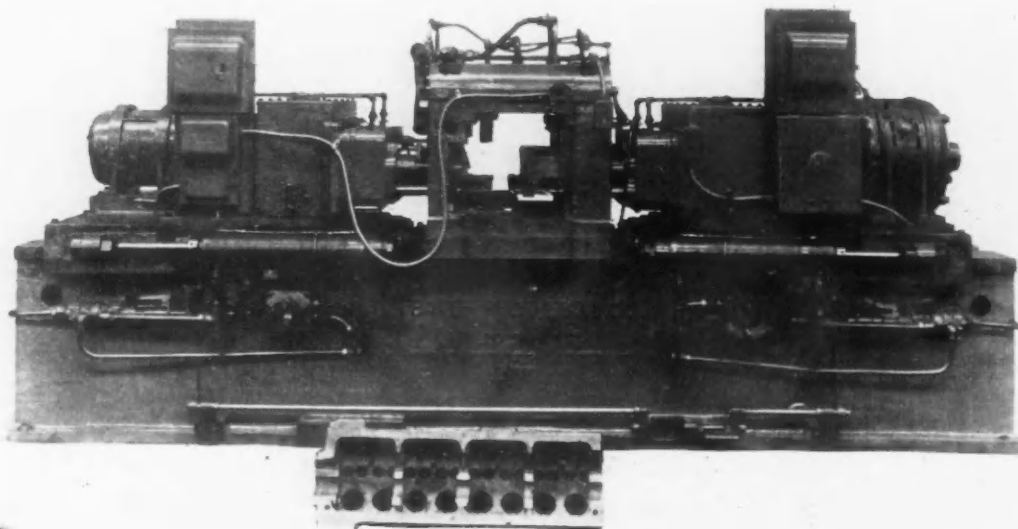
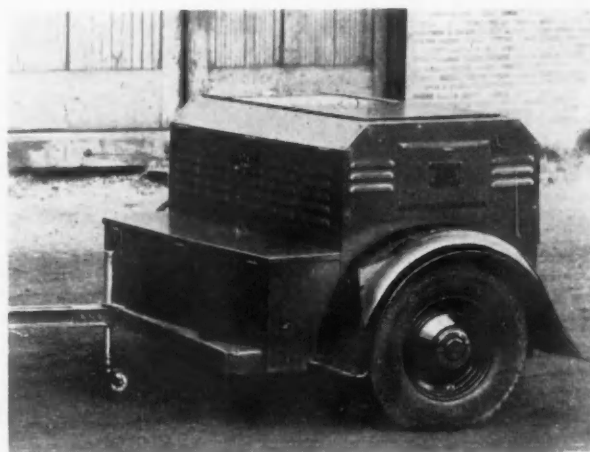
be economical in fuel consumption, because the motor idles when not welding. A dual control mounted in the unit and in the electrode holder automatically brings the speed to normal when the operator is ready to weld.

The welder is mounted on a low slung chassis and two wheels with doughnut type tires. It is equipped with a towing bar for attaching to an automobile or truck and can be towed at high speed.

Machine for Rounding Bevel Gear Teeth

A PEERLESS machine developed especially for rounding the teeth bevel gears is being marketed by the City Machine & Tool Works, Dayton, Ohio. This machine replaces the knife-like edge of the acute angle, which has a tendency to crack or chip in hardening or in service, with a smooth, rounded shape. It is self-contained and has capacity for bevel gears up to 18 in. outside diameter. Particular attention has been given to simplicity in set-up.

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TRAILER type arc welder for structural steel, pipe line and general maintenance work. The power unit is a Ford V-8 gas engine.
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OIL-FEED way-type drilling machine set up for drilling 16 valve holes in an eight-cylinder motor block. Another machine of the same type is used for a second boring, and a third machine for reaming.
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Attendance Records Broken at Power Show

MORE visitors than at the last Power show" is the unusual and encouraging report from the Tenth Annual National Exposition of Power and Mechanical Engineering held last week at the Grand Central Palace, New York. The number of exhibits was also impressive, although somewhat less than the number at the last New York show, held in 1930. This year more than 350 exhibits were on display, covering the great range of power and mechanical equipment from raw materials, such as refractories, copper and new alloys, through to elaborate factory air-conditioning systems.

One of the devices attracting most attention was of the perpetual motion class. This little machine, which was termed by its exhibitor, the Cochrane Corp., Philadelphia, "the nearest thing to perpetual motion," is in reality a small vapor turbine plant operated by the difference in temperature between the atmosphere when dry and that of saturated water vapor. This difference will be familiar to many as the temperature difference shown by a wet-bulb thermometer and an ordinary thermometer. So long as one thermometer bulb is kept wet and the atmosphere surrounding the other thermometer is kept moderately dry, a difference in temperature will be indicated and the flow of heat from the higher temperature to the lower is utilized by the ingenious Cochrane machine to produce power and, thus, motion. The principle of tapping a source of energy due to difference in temperature is the same as that used by Dr. Claude in his deep-sea thermal power plant designed to utilize the higher temperature of the Gulf Stream.

Another device of unusual interest was the electric eye control of a Berwick rivet heating machine. In this case the control was effected through the changing color of the rivet as it came up to desired temperature. Accurate within a range of 10 deg. F., a photo-electric tube operates to shut off the current.

As an attention-getter, the working model of a butt-welding tube mill of the Youngstown Sheet & Tube Co. was a success, although the mill itself, because it did not duplicate actual operations, required much explaining.

Instructions in Brazing

The Chase Brass & Copper Co., Waterbury, Conn., ran a miniature school for instruction in brazing, intended to promote the use of its new copper "sweat fittings." These fit-

ONE of the signs at the Power Show, held in New York, last week, stated that the devices on exhibit represented more than 25,000 industrial plants. The dominant note of the exposition was that the recent depression has begotten remarkable progress in the development of new products and new processes. The Power Show is now a definitely established institution. It came into existence as a department of the Chemistry Show, which it now equals in space and attendance. These two exhibitions are scheduled for appearance on alternate years at the Grand Central Palace. The next Chemistry Show is set for the early part of December, 1933, and the eleventh Power Show is scheduled for December, 1934.

tings are finished to such accurate tolerances that capillary attraction floods the contacting surfaces with the melted solder.

A recently developed abrasive cut-off machine was shown for the first time in operation by Andrew C. Campbell Co., Bridgeport, Conn. This machine performed the remarkable feat of cutting quarter-inch rings off the end of 2-in., thick-walled, glass tubing. It is intended for all sorts of cutting of plastics and other hard-to-cut materials.

Among the new materials exhibited were the following:

Plastic chrome-ore refractory for unusually high temperature metallurgical uses by the Botfield Refractories Co., Philadelphia.

New shapes and applications of fire brick and insulating brick by the refractories division of the Carborundum Co., Perth Amboy, N. J. This company reports a new refractory developed in its laboratory, which will be placed on the market in the near future. It is said to show longer life under very severe conditions.

New copper lead bearing alloys by A. Allan & Son, Harrison, N. J.

A new thin electrically deposited copper sheet shown by the American Brass Co., Waterbury, Conn. This last material is produced by depositing copper on a revolving drum and then shaving it off of the drum to form the sheet. The thickness of the sheet is determined by the speed of the revolution of the drum and the feature of the material is that it furnishes an inexpensive fire-resistant covering for roofs. The material shown

was almost paper-thin, in widths up to 50 in., supplied for roofing at a cost of less than 1c. a sq. ft.

A new metallurgical development, known as beryllium copper, was featured in the display of the American Brass Co., Waterbury, Conn. Its distinguishing property is the fact that it may be heat treated to greatly increase its strength. When heat treated and cold worked, a tensile strength of more than 175,000 lb. a sq. in. has been developed. At the booth of the American Brass Co. a beryllium copper chisel was used to sever small forged steel rivets.

Welding Fittings Popular

Many of the piping and fitting companies have developed standard welding fittings and flanges and the booth of Crane Co., Chicago, showed a complete set of these fittings designed to be welded in the field.

A new line of tilting disk valves was exhibited by the Chapman Valve Mfg. Co., Indian Orchard, Mass. In these the disk is pivoted slightly above the center and the advantages claimed are a larger flow area and quicker closing with near elimination of water hammer.

In the field of welding, the Linde Air Products Co., New York, showed several new pieces of equipment, including a blowpipe with a detachable body and an interchangeable torch which can be quickly switched to either welding or cutting.

The Timken Roller Bearing Co., Canton, Ohio, exhibited its usual line of roller bearings, but in addition showed an entirely new product in another field, a demountable or removable rock bit for rock drills.

An interesting development in silent steel construction was shown by Smith & Serrell, Newark, N. J. In order to reduce the noise of meshing gears, elaborate development in non-metallic gear construction has taken place. Now an all-steel, relatively silent gear has been produced which seems destined to give back to metal at least some of its lost prestige in the noiseless field. These new gears are made of thin steel laminations closely compacted.

The Fafnir Bearing Co., New Britain, Conn., showed a line of ball bearings in which the uniformity of balls is a special feature. When the company started manufacturing steel balls for ball bearings a variation in life of from 19 hr. to 4000 hr. was shown. Now with its improved methods of manufacture, the variation has been greatly reduced and the minimum life increased. The life range at present is stated to be from about 9000 hr. to 12,000 hr.

... PERSONALS ...



E. J. HAYDEN

E. J. HAYDEN, who was elected president of the International Acetylene Association at its recent annual meeting in Philadelphia, is manager of the central division of the Linde Air Products Co., with headquarters in Chicago. He has been active in sales and development of oxy-acetylene welding and cutting for more than 18 years.

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RICHARD A. NORTH, formerly technical assistant to the vice-president in charge of operations of the Grace Lines, Inc., has been appointed assistant chief engineer of the Farrel-Birmingham Co., Ansonia, Conn. He is a graduate of the Sheffield Scientific School of Yale University.

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GEORGE C. McMULLEN, who has been identified with the Timken Roller Bearing Co., Canton, Ohio, has joined the Tyson Roller Bearing Corp., Massillon, Ohio, as manager of industrial sales. During his 15 years with the Timken company, he organized the industrial bearings division and for many years had charge of bearing sales and engineering activities in the territory west of Denver. Prior to his Timken connection, Mr. McMullen was associated with the Timken Detroit Axle Co. and the Crane Motor Car Co.

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WILLIAM J. O'MEARA has been appointed engineer of the Baltimore office of the General Electric Co.

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A. M. SNODGRASS has been appointed production manager of the Pittsfield, Mass., works of the Gen-

eral Electric Co. He has been identified with the company for 20 years and was superintendent of the meter department at Fort Wayne, Ind., for several years prior to 1930. Since June 1 of that year he has been production manager of the West Lynn, Mass., works of the company.

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JAMES H. GILHULY on Dec. 31 will retire from active duties as district sales manager of the Youngstown Sheet & Tube Co. in the San Francisco territory and will be succeeded by ALEXANDER G. OAKLEY, of the Seattle office. Mr. Gilhuly has been with the Sheet & Tube company almost from its first day but he will continue in the employ of the company without the responsibilities of daily attendance. E. K. BLACKFORD has been appointed district sales manager of Seattle territory, succeeding Mr. Oakley.

Large Fabricators Join Construction Institute

The American Institute of Steel Construction has recently added the following new members: American Bridge Co., McClintic-Marshall Corp., Jones & Laughlin Steel Corp., Virginia Bridge & Iron Co., Roanoke, Va.; Bethlehem Fabricators, Inc., Bethlehem, Pa.; Burger Iron Co., Akron, Ohio; R. C. Mahon Co., Detroit. With these new memberships, practically the entire structural steel fabricating capacity of the country is now included in the institute. The addition of the American Bridge Co. and the McClintic-Marshall Corp., which together own a large percentage of the fabricating capacity, will add to the effectiveness of the institute's program for the future.

Republic to Fabricate Steel Farm Buildings

The Republic Steel Corp. has completed arrangements with the James Mfg. Co., Fort Atkinson, Wis., and Elmira, N. Y., to fabricate a new line of all-steel farm buildings to be launched shortly, according to T. M. Girdler, chairman of the board and president of Republic Steel.

Nationally known as a leading manufacturer of farm buildings, steel equipment and ventilating devices for all types of farm structures, the James company has developed a new line of all-steel buildings which, it is stated, will remove the age-old specters of fire and wind that threaten every farm home. Farm insurance rates will be greatly reduced and new standards of

animal health, sanitation and protection will be established. Conventional methods of housing live stock and storing crops will be revolutionized.

Republic's facilities for producing bars, galvanized sheets, tubing, wire and bolts and nuts within a narrow radius of Canton, coupled with the complete fabrication facilities at its Berger division, were the chief factors in the successful culmination of the deal. Canton also represents a convenient central shipping point for the finished product.

Republic will have no part in the marketing of the buildings, which will be handled by the field organization of the James company, consisting of more than 200 men, and the James dealer organization of several thousand firms.

The new connection is expected to step up operations materially at the Berger manufacturing division, and to provide very desirable galvanized tonnage for the Stark sheet mills at Canton.

T-Rail Track Shipments 1765 Tons in November

Shipments of T-rail track of 60 lb. per yd. and heavier in November totaled 1765 net tons, according to the monthly report of the American Iron and Steel Institute, compared with 1245 tons in October. The total for the 11 months of this year is 25,433 tons compared with 60,901 tons in 1931, 110,116 tons in 1930 and 162,115 tons in 1929.

Railroad Equipment

St. Louis-San Francisco has sold 2000 un-serviceable box cars to Hyman-Michaels Co., Chicago, which will dismantle the cars.

Pennsylvania Railroad is installing at its Altoona, Pa., shops motors and control apparatus in 20 suburban-type passenger cars; also in 20 other cars of similar type for use as trailers for local service on its New York division.

Coos Bay Southern has applied to Interstate Commerce Commission for authority to construct 5¼-mile extension from North Bend, Ore., to plant of Sitka Spruce Co.

Cast Iron Pipe

Fort Monroe, Va., through army quartermaster, has placed 200 tons of 12-in. with American Cast Iron Pipe Co.

San Bruno, Cal., has placed 3000 ft. of 6-in. and 5750 ft. of 8-in. with United States Pipe & Foundry Co.

Vernon, Cal., has awarded 284 tons to National Cast Iron Pipe Co.

La Habra, Cal., will take bids Dec. 27 on 48,940 ft. of 4- to 12-in. class 150, weighing 760 tons.

San Francisco, bids taken Dec. 12 on 50,000 ft. of 6-in. pipe, totaling 610 tons.

October orders for shelving furniture reported by 16 establishments were valued at \$143,708 against \$153,276 in September.

OFF THE ASSEMBLY LINE



Automobile Industry Expands Output; Chevrolet To Buy Steel This Week

DETROIT, Dec. 12.

AUTOMOBILE manufacturers have expanded operations the past week, with the result that today more plants are active than at any time since July. In some cases this has meant the resumption of production by factories which have been idle for the last four or five months. Employment in southern Michigan has been benefited substantially, and the outlook for the next two to three months is for tens of thousands of workers to be employed at least part-time, thus giving them a steady income during the winter.

Chevrolet now has on its payroll at its manufacturing plants and in its administrative forces 30,000 men, while Fisher Body Corp. has 18,000 men at eight plants working on Chevrolet bodies. In addition, there are 36,000 dealers and salesmen now engaged in Chevrolet activities. This entire staff of 84,000 people is assured employment through the winter and spring months, according to an announcement by W. S. Knudsen, Chevrolet's president. Chevrolet dealers now have on hand the largest number of advance orders for new cars, to be publicly disclosed next Saturday, in the company's history. Chevrolet's Flint plant has taken bids on first quarter steel requirements, consisting mainly of sheets and strip steel, and this week is expected to give releases for steel for 40,000 to 50,000 cars. Assemblies this month will be about 55,000 cars and in January 65,000. With the completion of its new steel buy, Chevrolet will have placed steel for the first 150,000 of its 1933 models.

Other Companies Active

Pontiac, which will discontinue its six and V-eight in favor of a straight eight, is making about 8000 of the new series this month and will turn out a like number in January. Oldsmo-

Chevrolet expected to buy steel for 40,000 cars. Chevrolet's working forces now total 84,000.

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Oldsmobile, Hudson, Cadillac and De Soto resume operations.

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Motor car production in United States and Canada during 1932 estimated at 1,425,000 units, compared with 2,472,359 in 1931.

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bile has ordered 4000 men back to work today on its new line, which will be shown early next month. It will assemble 2300 units this month and 5800 during January. Hudson has announced that it is expending \$12,000,000 for materials and parts for new models to be manufactured under the Hudson and Essex Terraplane names and that deliveries will begin Dec. 19. Cadillac is limiting its output of 16-cylinder cars during 1933 to 400, each of which will have a custom-made body. Continental Automobile Co. surprised the trade with the announcement that it will offer two sixes instead of a four and a six; one will supplant the De Vaux in the low medium price range, while the other will compete in the lowest price field. Continental points out that its advantages of low overhead expenses give it perhaps "the lowest fixed charges in the industry," and, therefore, make possible the low prices at which the new cars will be sold.

Plymouth probably will carry over through January its current schedule of about 18,000 cars a month, while Dodge is operating on a fair scale. De Soto has begun production of its cars which will be revealed at show time. Chrysler gave Detroiters a preview of its new line on Friday and

Saturday, a month ahead of the nation-wide showing. The Chrysler foundry is running at capacity and is not only using all the scrap available within the corporation, but also is buying scrap outside. The overflow work has increased in the past few weeks so that outside foundries, especially one at New Haven, Mich., are getting some attractive orders. Chrysler Corp. has put out its first quarter steel inquiries and will award contracts before the end of the month. Packard, which has been assembling cars as orders came in, has projected a tentative schedule for the next 90 days which will contribute to more regular operations and steadier employment of its men. All of the quality car makers are encouraged at the improvement in their sales during the past three months.

Ford to Buy Steel

Sometime this month, possibly this week, Ford will make its first major purchase of steel for several months, although the tonnage will not be of spectacular proportions. Recently its steel orders have been confined to small lots to try out dies. Ford is said to have considerable releases of steel on old contracts which must be cleaned up before fresh buying runs into large tonnages. Production at the Rouge plant is not likely to change much the remainder of this month, output being maintained at about 1000 cars a day, three days a week.

General Motors has revealed that in the past year its stocks of new cars have been reduced 46,246 units, the total cars in the field having been cut down to the lowest level since comparable statistics were first prepared in 1922. Of particular encouragement is the fact that if 1933 sales to consumers are no larger than in 1932, and the industry is confidently counting on at least a small increase, General Motors will be re-

quired to augment its working forces and its purchases of materials.

Large Machine Tool Purchases

Machine tool purchases at Detroit have been the largest in months. One automobile manufacturer has placed orders for boring, drilling and milling machines totaling several hundred thousand dollars, and another maker has purchased six gear-cutting machines. An important motor car company is considering the expenditure of considerable money for machine tools in its transmission department. It is conservatively estimated that machine tool orders to be placed by the automobile industry in the next 30 to 60 days will total \$400,000. It is reported that a like amount will be spent on jigs, fixtures and special attachments.

To Use Black Sheets for Bodies

It now seems assured that a prominent motor car company will change over from full-finished sheets to the common black grade for body purposes. It is asserted that this sharp cleavage from present practice is possible and practicable because of the development of a new finishing material which will give the body the same spotless, unblemished appearance it now has. The steel trade is convinced that this manufacturer will encounter many difficulties in adopting the new method and is not ready to concede that the common grade of sheets can be successfully utilized for this purpose. However, this company has pioneered on numerous occasions by accomplishing what others thought was the impossible and perhaps past performance may be repeated. At any rate, the matter is of deep concern to the steel trade, as overnight a considerable market for the product of cold finishing mills may disappear. If this company does what it expects to do, the sheet steel industry will be dealt a hard blow at a time when it can least stand it.

Railroad Purchases Decline \$1,600,000,000

Railroad purchases of equipment, fuel, materials and supplies and miscellaneous services in 1932 will show a reduction, according to a special issue of *Railway Age*, of \$1,600,000,000 below the corresponding purchases made annually in the five years 1925-1929. Total railroad purchases in the five years ended with 1929 averaged \$2,325,000,000; they amounted in 1929 to \$2,285,000,000; in 1932 it is estimated that these purchases will be \$650,000,000.

From the 1929 total of \$2,285,000,000, railroad purchases fell to \$1,985,000,000 in 1930, and declined again to \$1,135,000,000 in 1931. With the

further drop of almost \$500,000,000 in 1932, railroad purchases in the last three years have shown an aggregate decline of more than three billion dollars below what they would have been if the average purchases of the five years ending with 1929 had been maintained.

"The necessity of restoring railway purchasing and its immediate and profound effect on business reduce the problem to that of restoring the ability of railroads to make these purchases," says *Railway Age*. "The solution of this problem requires recognition of the fact that the impairment of railroad buying power is not a product of the depression alone, but is one of the inevitable effects of the public policies affecting the railroads which were pursued long before the depression began. If the force of America's greatest industry is to be utilized in restoring business and commerce through its purchasing power, the railroads must be treated as their competitors are treated. Such modifications must be made in the restrictive laws which now regulate the railroads, and such assurances of a constructive public policy toward the steam lines must be given as will restore the confidence of the investor and otherwise reestablish the financial credit upon which our rail transportation depends."

Ornamental Iron Trade Rules Are Approved

WASHINGTON, Dec. 13.—With minor modifications, the Federal Trade Commission has approved 28 trade practice rules adopted by fabricators of ornamental iron, bronze and wire at a conference in Cambridge Springs, Pa., Oct. 3. More than 400 companies were represented at the conference. The total annual production of these companies is estimated at approximately \$74,000,000 or almost 90 per cent of the entire production of the industry.

Group I rules, those covering 10 practices held to be illegal, pertain to such matters as using or substituting in structures materials inferior in quality to those specified by the purchasers; using methods of manufacture and erection not in accord with applicable governmental laws; selling goods below cost with the intent and with the effect of injuring a competitor; secret payment or allowance of rebate; wilfully inducing or attempting to induce breach of existing contracts between competitors and their customers; shipping or delivering products which do not conform to the samples submitted; aiding in the use of unfair trade practices; discrimination in price between different customers where the effect is to substantially lessen competition, etc.

Group II rules, totaling 18, are those accepted by the commission as

expressions of the trade. They include the following subjects: Various practices of bidders and sub-bidders; inducing an architect, contractor or builder to reveal to a bidder on a competitive job information relative to bids already received; surreptitiously obtaining information relative to competitors' bids.

Fluorspar Producers Oppose a Lower Tariff

WASHINGTON, Dec. 13.—Opposition to a decrease in the duty on fluorspar was expressed by domestic producers at a hearing last Thursday before the Tariff Commission.

The commission was told by R. C. Allen, of the Oglebay, Norton & Co., Cleveland, that new processes have put domestic mines in a position to increase their output and make the United States self-contained as to fluorspar requirements. Economic conditions, stocks on hand and imports were cited as the causes of reduced shipments from domestic producers. In the event mines in Illinois and Kentucky continue to shut down, Mr. Allen said, there will be no acid grade of spar for industrial needs. It was declared that certain waste material made available through the use of a flotation process will have future possibilities in producing concentrates.

In reply to a question, Mr. Allen said the production of fluorspar by individual operators has increased because of economic conditions. The view was expressed, however, that the amount of spar to be produced by "primitive" methods in the future cannot exceed the amount produced in the past.

Other witnesses were asked about alleged price agreements and denied their existence.

Unfilled Steel Orders Decline 28,739 Tons

Following three consecutive monthly increases the unfilled orders of the United States Steel Corp., as of Nov. 30, declined to 1,968,301 tons, or 28,739 tons below the Oct. 31 total.

Unfilled orders at the end of each month since 1929 follow:

	1932 Tons	1931 Tons	1930 Tons
January	2,648,150	4,132,351	4,468,710
February	2,545,629	3,965,194	4,479,748
March	2,472,413	3,995,330	4,571,653
April	2,326,926	3,897,729	4,354,220
May	2,177,162	3,620,452	4,059,227
June	2,034,768	3,479,323	3,968,064
July	1,966,302	3,407,816	4,022,055
August	1,969,595	3,169,457	3,580,204
September	1,985,090	3,144,833	3,424,338
October	1,997,040	3,119,432	2,481,768
November	1,968,301	2,933,891	2,639,636
December	2,735,353	3,943,596

Business May Get Little Aid From This Session of Congress

President Hoover's Recommendations Probably Will Be Blocked Because of Lack of Party Support

By L. W. MOFFETT

WASHINGTON, Dec. 13.—Present indications are that business may expect little or nothing from the short session of Congress. Rarely has there been such an emphatic demonstration of the futility of a lame duck session of Congress. And never was there more pressing need for harmony and quick action on sound legislation without regard to party lines or political power. Whether the seriousness of the situation may bring about a change in the American constitutional system remains to be seen. It is certain that it strikingly gives force to the need for the abolition of lame duck sessions and shorten the gap between changes in executive administration following a political turnover.

It is probably true that the blame for the situation rests as much on one of the major political parties as on the other. But under the existing condition, it happens that the Democratic party will come into overwhelming control of the executive and legislative departments of the Government on March 4. The upshot is that it is looking eagerly to the power that soon will come within its grasp. Meanwhile, it apparently is seeking to block proposals of the outgoing Republican administration. With a Democratic majority in the House and a thin and uncertain Republican margin in the Senate, it is no difficult matter to tie the hands of President Hoover.

President Hoover's Recommendations Are Strongly Opposed

That this is being done is manifest from the manner in which his messages to Congress were greeted. The strong opposition seems to have the position that, no matter how sound, whatever President Hoover proposes is to be blocked. The play seems to be for an extra session of Congress with the advent of Franklin D. Roosevelt as president. Such a session, which Governor Roosevelt himself originally resisted, now appears inevitable unless Governor Roosevelt forces a change in Democratic procedure in this Congress.

The budget message of the President sounded a grave warning of the critical financial position of the Government and set forth specific recommendations to remedy it. The annual report of Secretary of the Treasury Mills carried similar recommendations to overcome the huge deficit of the

Treasury, and proposed banking reform. Some of the recommendations have been previously accepted and urged without regard to party lines. But their presentation from the outgoing administration was met by many in Congress with an attitude that was scarcely short of open hostility. In the meantime "programs" almost without number have been set up by different members of Congress and occasionally they do not differ widely from proposals of the administration itself. On banking reform especially there is general agreement as to its need, though not unanimity as to its character.

The President presented a budget totaling \$4,218,808,344 for the fiscal year 1934. He told Congress it represented a slash of approximately \$830,000,000 under the 1933 budget but that because of "unavoidable increases," such as interest on public debt and other items, the prospective saving would be partly offset by about \$250,000,000. The net cut in Government expenditures therefore would be about \$580,000,000.

President Advocates Sales Tax

Briefly, the President recommended:

A general manufacturers' sales tax at a rate of 2½ per cent, estimated to yield \$355,000,000 annually.

Continuation until June 30, 1934, of the 1c per gal. gasoline tax, with a prospective annual yield of \$137,000,000.

Decrease of 11 per cent in salaries of civilian employees of the Government, with the first \$1,000 exempted, estimated to save \$55,000,000 annually.

Continuation of existing 8½ per cent cut in Government salaries under furlough plan, estimated to save \$97,398,000.

Cut in War Veterans' appropriations, a saving of \$127,000,000.

Elimination of appropriation for regular and emergency public roads construction, a saving of \$201,999,939.

Reduction of public works and elimination of emergency construction program, saving of \$90,129,450.

Reduction of rivers and harbors work and elimination of certain emergency construction, saving of \$80,158,696.

The President's recommendation for enactment of a general manufacturers' sales tax apparently does not have the slightest chance of being followed. Despite the fact that it is in complete line with such a proposal submitted by the House at the previous session by a Democratic Ways and Means Committee, it was vigorously condemned, even by some

who have openly advocated such a tax. The sales tax proposal was enlarged upon by Secretary Mills in his report. He would repeal existing nuisance taxes, which have failed to yield the income anticipated, and provide that the sales tax could not be pyramided.

Do-Nothing Attitude Apparent

So it is with economy measures. Extremely necessary as they are, Congress appears to have adopted a do-nothing attitude and to await the special session, leaving a budget that will not be balanced in the new fiscal year. Supply measures will have to be enacted, but further ones appear likely to be withheld until the special session. It seems now too that beer and other revenue legislation will have to go over until the extra session. Plans to tack a beer bill to a sales tax or appropriation measure as a means of avoiding a Presidential veto apparently are no longer being given serious consideration.

Banking Reform Urged

The President and Secretary Mills proposed banking reform by immediate authorization of trade area branch banking to provide temporary aid to national banks. The Secretary of the Treasury expanded on this suggestion and then proposed a joint committee of Congress for a study of data with a view to legislation to remedy "the fundamental weakness of our banking structure." The Secretary declared that "the excessive growth in the number of banks was due in part to our dual system of state and national banks and to a laxity resulting from its competitive system." He further said that both state and national authorities have in the past granted charters too freely and that the banking system of the United States, as shown by the many failures during the depression, did not successfully meet the test of adverse circumstances.

Broader branch banking was urged and attention was called to the extent to which many banks with deposits payable on demand have allowed too large a proportion of their assets to become tied up directly or indirectly in capital commitments. It was also added that in some instances the functions of commercial and investment banking have become merged under the same management "to such an extent as to present a difficult and important problem calling for remedy."

Glass Bill May Be Enacted

To a large degree the Senate was sympathetic toward proposed banking reform, but the House apparently is not inclined to go along with the administration. This has given strength to the bank reform bill of Senator Glass of Virginia, widely accepted as sound authority in banking and finance, and efforts will be made to enact it at the present session.

The measure has a great deal of support from administration Republicans, for it was drafted after prolonged hearings and study. It proposes regulation of inter-bank control and seeks to prevent use of bank funds for speculative purposes. No doubt the measure would be enacted at a special session if called up then and

in the event Senator Glass was appointed Secretary of Treasury.

In any case, the lame duck session of Congress promises to prove a sad and costly spectacle to business of the country unless it is forced to forget politics and turn urgent and drastic action to cut down Government expenditures and balance the budget.

OBITUARY

GEORGE H. ISLEY, manager of the combustion control department, Morgan Construction Co., Worcester, Mass., died on Nov. 30, aged 50 years. He went to Worcester in 1906, where he became identified with the Morgan company as a draftsman. He was active for many years in the gas producer department, where he contributed a number of inventions and patents to the development of the producer gas machine. Mr. Isley later became interested in high-temperature furnaces, to which he made a number of improvements.

COLONEL ROBERT STREETER, consulting engineer and formerly vice-president and chief mechanical engineer for the United States Aluminum Co., New Kensington, Pa., died on Dec. 10 in Chicago. He was 62 years of age, and was graduated from Pennsylvania State College in 1903. During the war he served as commandant of the Rock Island, Ill., Arsenal, and prior to that time had been professor of steam and gas engine design at Rensselaer Polytechnic Institute. He became associated with the Aluminum company in 1919. He was prominent in the affairs of the American Society of Mechanical Engineers, and was the author of a number of textbooks on gas engine design.

EDWIN RUUD, president of the Ruud Mfg. Co., Pittsburgh, maker of water heaters, died at his home in that city on Dec. 9. He was born in Norway 78 years ago, and came to the United States in 1882. He had been active in the development of new products in the industry which he served, and had been honored by foreign governments for his engineering achievements.

LOUIS J. PETIT, prominent industrialist, of Milwaukee, died Dec. 2, after an emergency operation. He was 76 years old and a native of Syracuse, N. Y. His residence in Milwaukee began in 1877. He was the principal owner of the Norrie and Pabst iron mines in northern Michigan. These were said to be the first mines ever to attain 1,000,000 tons annual output. The mines, with several Great Lakes ore carriers, were sold to the Carnegie Steel Co. about 25 years ago. Mr. Petit was a direc-

tor of the Milwaukee Road from 1907 to 1920, and for many years was a trustee of the Northwestern Mutual Life Insurance Co., Milwaukee. Early in the World War he directed the organization of the Old Ben Coal Co., at one time operating 14 mines in West Virginia and Illinois.

WILLIAM A. KAHN, engineer and machinery designer, Milwaukee, died Dec. 9, aged 68 years. He was born at Sauk City, Wis., and joined the old E. P. Allis Co., forerunner of the present Allis-Chalmers Mfg. Co., in 1899, as an erecting engineer. In this capacity he was sent to Buenos Aires for the building of a street railway in 1908, and several years later to London for an underground railway project. More recently Mr. Kahn was general foreman of the Davis & Thompson Co., Milwaukee, manufacturer of special machine tools. About two years ago he designed and developed a gigantic planer, with a tractor as motive power, for scraping rough surfaces of hard roads and streets.

BEDFORD F. TYLER, purchasing agent of the Gulf States Steel Co., Birmingham, died on Dec. 2 from injuries received in an automobile accident. Mr. Tyler, who was 70 years old, had been connected with the Gulf States company since 1909, and previously had worked with the Tennessee Coal, Iron & Railroad Co. and the former Republic Iron & Steel Co.

GEORGE P. BALDWIN, vice-president of the General Electric Co. in charge of steam railroad electrification, died of pneumonia in the Doctors' Hospital, New York, on Dec. 7, aged 58 years.

ANDREW CHISHOLM DALLAS, who retired in 1917 from the chairmanship of the Dallas Brass & Copper Co., Chicago, died Dec. 10, aged 83 years. He was born at Palmera, Province of Ontario, Canada. He went to Chicago in 1891 and entered the lumber business. In 1897 he became Chicago district sales manager for the Benedict & Burnham Co., and in 1908 he organized the A. C. Dallas & Son Co.,

Chicago. Starting out in the jobbing business, this company gradually worked into manufacturing and it eventually became the Dallas Brass & Copper Co., of which the son, C. D. Dallas, was president and A. C. Dallas was chairman of the board. In 1928 the Dallas company became a unit in the Pevere Copper & Brass, Inc. After retiring in 1917, Mr. Dallas spent much time in traveling.

EDWARD A. NIVEN, Pittsburgh district sales manager for the American Steel & Wire Co., died suddenly at his home in that city on Dec. 5, following an apoplectic stroke suffered in his office in the morning of that day. He was 59 years of age, and a native Pittsburgher, having entered the wire business 40 years ago with the old Oliver Wire Co. at Pittsburgh, which later became a part of the American Steel & Wire Co. He had served successfully in the Florida, New England, Buffalo and New York territories of the Steel & Wire company, having succeeded to his recent position in 1923.

GEORGE E. DEAN, president, Union Steel Products Co., Albion, Mich., died on Dec. 2. He was 60 years old.

ARNOLD KARTHAUS REESE, an expert on the blast furnace and a resident for some thirty years of Great Britain, died Dec. 10 at Johannesburg, South Africa, according to a cable despatch received at Baltimore, where he was born in 1867. He contributed frequently to the proceedings of the (British) Iron and Steel Institute, of which he was a member resident at Weybridge, Surrey, England. He was graduated in engineering from Lehigh University.

Ruling on Pipe Fittings Duty Effective Jan. 7

WASHINGTON, Dec. 13.—The Bureau of Customs has extended to Jan. 7 the effective date of its ruling that steel nipples or threaded pipe fittings not longer than 12 in. are dutiable at 45 per cent. The bureau held that the fittings should be classified under paragraph 397 of the tariff act as manufactures of metal rather than under paragraph 328 as pipe, taking a duty of 25 per cent.

By decree effective Dec. 6, the Rumanian Government requires import permits for the importation into Rumania of a wide range of products, including automobiles, machinery, typewriters, electrical goods, chemicals, etc., according to a cablegram received in the Department of Commerce from Sproull Fouche, commercial attache, at Bucharest.

• EDITORIAL COMMENT •

Brewing and Rustless Steels

UNDOUBTEDLY there is a wide field of usefulness for the rustless steels in the brewing industry. Because of certain well-known conditions in that industry in the United States, an actual study of the value of these alloys in the various stages of the manufacture of beer has been impossible since the enactment of the eighteenth amendment. In other countries, such as Germany, there has existed no such handicap. Private advices are to the effect that the corrosion resistant alloys of this type are gaining wide-spread use in the German brewing industry. For example, the number of rustless steel barrels put into the production of beer in Germany for a period of six years, or from 1925 to 1930 inclusive, has increased from 1164 to 14,453, the largest number having been 15,235 in 1929. The total for the six years is 57,907 barrels. Put in another way the number put into use in 1929 and 1930 is nearly 26 times those introduced in 1925. Other data are that the installation of rustless steel fermentation tanks and vats represented only 200 hectoliters or 5284 U. S. gallons in 1926, which had increased to 44,000 hectoliters or 1,162,480 gallons in 1929.

These few facts indicate that the rustless steels are of evident commercial value in the brewing industry. If there is a return to legalized beer in this country, it is probable that a new outlet of no small proportions will be afforded these remarkable alloys which have already demonstrated their value in other lines of industry in this country.

Steel Demand Shrunk Less Than Automotive

IN three years of depression September has shown automobile production 13.3 per cent under the ratio to total steel ingot production that obtained on an average in the five years 1924 to 1928 inclusive. In September, 1932, alone the deficiency was 11.9 per cent, against 7.9 per cent the preceding September and 20.0 per cent in September, 1930.

The statistical showing is quite by the book. First, the deficiencies in depression are relatively small, because automobiles lie between the steel that must be had year by year, like tin plate, and the steel that one can postpone buying for a long time, in connection with certain classes of construction. Second, automobiles do wear out in a few years and so the first year of depression showed the largest deficiency.

The comparisons are purely relative, as both automobile and steel production went down. In the following table the first column shows for September the production of cars and trucks, United States and Canada. The second table shows total production of steel ingots in the United States. Through 1926 the monthly reports included electric and crucible, subsequently dropped, and the figures below include a pro-rating for such months, based on the annual production. The third column shows the ratio of

automobile production to steel production with 1924-28 as base, or 100. It will be noted that the ratio was almost precisely one automobile unit per 10 tons of total steel ingot production.

Month of September

	Automobile Production	Steel Production	Autos to Steel
1924-8	353,473	3,543,029	100.0
1929	429,729	4,572,700	94.2
1930	228,606	2,862,700	80.0
1931	143,212	1,559,900	92.1
1932	86,483	984,200	88.1

There is ground for argument that the automobile industry is faring better as to demand, relative to the steel industry, than is indicated by the bare figures. Both last year and this the particular month of September lacked two stimuli to automobile buying that existed in the base period 1924-28. In those years there was a swing from open to closed cars, which stimulated autumn buying as that was a good time to make the change. Also there was the stimulus of new models brought out in summer. The automobile industry has ground for hoping it will make a relatively good showing next season, particularly if it follows the policy of modernizing its manufacturing methods to the last degree.

New Application of Electric Furnace Iron

ADOPTION by the Hudson Motor Car Co. for its Essex Terraplane of a camshaft cast from electric furnace iron and the imminent use of a cast crankshaft and camshaft by another automobile manufacturer focus the spotlight on the swift development recently of high-strength alloy cast iron made in the electric furnace.

It is significant, and of great promise, that this material is encompassing ever-widening vistas, with a growth little short of phenomenal in the motor car industry where production costs and long service life are major considerations. One of its more spectacular applications is by the Ford Motor Co. for its V-8 cylinder blocks; other manufacturers are making from it not only cylinder blocks, but also brake drums and other parts. With a tensile strength as high as 70,000 lb. per sq. in. and a Brinell hardness of 300, it is displacing forged steel in parts where a short time ago metallurgists would have pronounced it impracticable.

Commenting on the intense interest in electric furnace iron throughout the metal-working industry, the chief engineer of a large automobile company recently pointed out the advantages of this material to be: (1) strength approximately double that of ordinary cast iron, (2) increased wear resistance, (3) reduced growth characteristics, (4) heat resistance, and (5) corrosive resistance.

To this list might be added its adaptability for experimental purposes and the leeway it will give to designers in planning structurally light products of intricate shapes.

These advantages, however, inadequately describe the far-reaching influence which electric furnace iron will possess. Perhaps its greatest service to industry, suggests one observer, lies not so much in its inherent characteristics and what they will do for the individual manufacturer as in the setting up of standards which eventu-

ally will result in an improvement of castings of all descriptions, regardless of how they are produced.

With the continued growth of the use of electric furnace iron, therefore, may come a new lease on life for the entire foundry trade. Perhaps as one commentator has said, "In this age of steel we are prone to underestimate the important position occupied by cast iron," and the interest now being manifested in electric furnace iron may make us more sensitive of that fact.

Railroads Ask Continuance of Emergency Freight Rates

Protests Are Expected in View of Depressed Condition of Industry
—Surcharges Were to End March 31

WASHINGTON, Dec. 13.—With industry generally suffering equally with the railroads from the depression, it is expected that the Interstate Commerce Commission will receive a large number of protests against the petition of the carriers to continue emergency rates after March 31. Hearings probably will be held at an early date on the petition, formally filed last Saturday.

When the carriers petitioned for a flat 15 per cent increase in rates last year the commission denied the application but suggested increases could be allowed on certain commodities and these were applied, amounting broadly to an advance of 10 per cent over existing rates. Iron and steel products, coal, and coke were included in the long list of commodities to which the increases were applied and it was proposed they be continued until March 31, 1933. The iron and steel industry generally was responsive to the carriers' appeal for higher rates in order to increase revenue.

The petition does not suggest when the higher rates would terminate. It is the plea of the carriers that the surcharges will not exceed more than \$60,000,000 in 1932, and doubt is expressed that that sum will be realized. They amounted to only \$41,991,194 in the first eight months of 1932. The commission estimated they would yield from \$100,000,000 to \$125,000,000 in 1932, based on 1931. Traffic, however, has greatly declined. The carriers show deficits in 1932 in all sections of the country after fixed charges, save for the Pocahontas region, which reported a surplus of \$21,490,367.

Emergency Rates Have Not Covered Unearned Fixed Charges

The petition states that at the time when the emergency rates became effective it was estimated that approximately \$60,000,000 would take care of the unearned fixed charges. But, it is pointed out, owing to the

falling off in railroad traffic, conditions have grown so rapidly and substantially worse that the amount required to take care of the carriers' unearned fixed charges for 1932 will be "very largely in excess of the amount so estimated."

The carriers say that "while there are indications that conditions are improving and it is hoped that they will continue to improve, it is believed that for some time in the future they will not improve to the extent of changing substantially" conditions which are described.

The statement also makes clear why the carriers are buying iron and steel and other requirements in such limited quantities, more so than at any time in the present century.

The carriers ask that they no longer be required to lend money arising from surcharges to weaker roads. This plan of pooling money for this purpose was operated through the Railroad Credit Corporation. If it is eliminated it no doubt means the carriers will lean more heavily on the Reconstruction Finance Corporation for loans.

Will Serve on Engineers' Committees

Some of the important committee appointments of the American Society of Mechanical Engineers, announced at a meeting of the council of the society at the close of the annual meeting in New York last week, are as follows:

Finance: D. Robert Yarnall, Yarnall-Waring Co., Philadelphia. Library: George F. Felker, vice-president, Crosby Steam Gage & Valve Co., New York. Local Sections: R. E. W. Harrison, consulting engineer, Cincinnati. Meetings and Program, Dr. Harvey N. Davis, president, Stevens Institute of Technology, Hoboken,

N. J. Membership: Charles L. Davidson, superintendent of power stations, New York Central Railroad, New York. Professional Conduct: James H. Herron, consulting engineer, Cleveland, reappointed for five years, and C. G. Spencer, Baker & Spencer, Inc., New York, appointed for three years. Professional Divisions: Prof. George B. Pegram, Columbia University, New York. Publications: Montague H. Roberts, Franklin Railway Supply Co., New York. Research: Dr. Charles Russ Richards, president, Lehigh University, Bethlehem, Pa. Awards: Prof. R. C. H. Heck, Rutgers College, New Brunswick, N. J.

Nickel-Clad Steel Now Available in New Finish

Up to the present time, nickel-clad steel, a joint development of the International Nickel Co. and Lukens Steel Co., produced in the latter company's mills at Coatesville, Pa., has been available only in the regular hot-rolled finish, the nickel surface of which carries the tightly adherent nickel oxide film, dark olive brown in color. This nickel oxide finish is formed during the rolling of the bi-metal at high temperatures, and is somewhat similar to the finish on standard hot-rolled steel plates. While this type of finish, due to the corrosion resistant properties of the nickel oxide itself, will continue to be produced, a new and finer finish is now available.

With the new finish, classified as "hot-rolled and cleaned," nickel-clad steel is free, the producers say, from the brown nickel oxide on the nickel side. The cleaning process gives the nickel a matt appearance nearly white in color, with surface superior to that produced by standard plate mill practice. This "hot-rolled and cleaned" finish, however, should not be confused with the bright, lustrous surface of cold-rolled and full finished solid nickel sheet, where refinement is obtained by cold rolling.

A class in structural engineering and trade drafting is being organized for Tuesday and Thursday evenings from 7 to 9 in Stuyvesant Evening Trade School, 345 East Fifteenth Street, New York.

SUMMARY OF THE WEEK'S BUSINESS

Steel Production at 15 Per Cent As Industrial Activity Slows Down

Automobile Manufacture Alone Shows Upward Trend—Tin Plate Rollings Will Decline Next Week—Structural Awards and Inquiries Larger

WITH nearly all industrial activities except motor car manufacture slowing down as the year-end approaches, business in finished steel, pig iron and scrap is undergoing further contraction.

Steel ingot output has declined to 15 per cent for the entire country against 16 per cent last week, and the rate probably will drop lower next week, while in the period from Christmas to New Year's there will be almost complete cessation of production at many steel plants.

Only at Cleveland has there been a gain in steel output this week. One plant there which has an accumulation of automobile orders has added an open-hearth furnace, bringing the local rate up to 29 per cent from 26 per cent a week ago. The Chicago district has fallen slightly below 10 per cent, and there have been declines in the Valleys and at Wheeling, while the Pittsburgh rate is unchanged at 15 per cent.

In the final week of the year the steel industry may drop below the previous low point of the depression—about 12 per cent at the beginning of last July. Year-end curtailment will, in fact, begin next week, when one tin plate mill will suspend and another will sharply reduce production, which will affect raw steel output in districts where tin plate is a major item of manufacture.

ALTHOUGH tin plate rollings are at 45 per cent this week, this rate cannot be maintained during the remainder of the month because of the slowness of can manufacturers in signing 1933 contracts and specifying their January requirements.

This waiting policy extends to nearly all consumers and distributors of steel, few of whom are willing to enter into commitments for the first quarter, presumably because of the uncertain business outlook and the fact that nearly all current steel prices are being continued into the new year. Leading makers of bars, shapes and plates have announced that first quarter quotations will be unchanged at 1.60c. a lb., Pittsburgh, which completes the price schedules for the next three months. The only important change is an advance of \$2 a ton on No. 24 gage hot-rolled annealed sheets.

THE automobile industry presents a contrast to the hesitation prevalent in other lines. Motor car manufacture has been expanded in the past week and now is more active than at any time since July. A few

plants that have been idle for months have resumed production. Chevrolet is leading the field in car assemblies, having 30,000 men at work with 18,000 additional engaged in building Chevrolet bodies in the Fisher plants. It will complete 55,000 cars in December and plans to build 65,000 in January, and may release steel orders this week for next month's requirements. The Chrysler Corp. has also put out first quarter steel inquiries and will buy before the end of the month. The Ford company has placed only a few small orders, but may buy several thousand tons this week. Machine tool purchases at Detroit have been the largest in months. Further purchases in the next month or two may total \$400,000, with a like amount to be expended for jigs, fixtures and special attachments.

Prospects for a renewal of railroad buying are complicated by the insistence of the carriers on an extension of the emergency freight surcharges and wage reductions, and until these matters are settled there will be little inclination among the carriers to undertake major buying programs. Except for a few small rail releases, including one of 2500 tons from the Illinois Central, railroad orders are meager. Unless steel companies can see a larger volume of railroad buying early next year, they may oppose the continuance of the freight surcharges. Without a substantial gain in business, steel producers must effect further economies, among which another wage reduction for steel workers will undoubtedly receive serious consideration.

A bunching of awards for Federal building projects brought the week's fabricated structural steel contracts to 35,600 tons, the largest in many weeks, and new projects also come to a high total at 40,000 tons. The largest lettings were 11,200 tons for the Cleveland Post Office, 7500 tons for the Archives Building, Washington, and 6550 tons for the Philadelphia Customs House. Outstanding jobs on which bids are to be taken are anchorages for the Trans-Bay bridge, San Francisco, calling for 11,000 tons, and the Federal Court House, New York, requiring 9000 tons. Private work in the offices of architects and engineers is reported to be in larger volume.

Pig iron production, as well as steel operations, will undergo year-end curtailment. Three Alabama furnaces, two Woodward and one Republic, are being put out this week, reducing the active stacks in that district from five to two. Pig iron trade in all centers is extremely dull both for prompt and first quarter delivery.

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails, Billets, etc.

Old Material

Finished Steel

Coke, Connellsville

Metals

Finished Steel

Pig Iron

Steel Scrap

High	Low
\$14.81, Jan. 5;	\$13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

HIGH	LOW
\$8.50, Jan. 12;	\$6.42, July 5
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 29

Pittsburgh Steel Output Is Holding; Declines in Valley and at Wheeling

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PITTSBURGH, Dec. 13.—Orders for finished steel products in the aggregate have held their own in the last week, and operations in the district are no lower. Sizable awards for structural steel have been a feature of the last few days, but demand from other sources continues very light. While automobile production schedules seem to be improving, most of the steel required for this month has already been shipped, and movement to Michigan plants over the remainder of the month will likely be small. No fresh releases from the railroads are reported, and demand from small miscellaneous manufacturing consumers seems to have reached a minimum.

Steel ingot production in the district continues at 15 per cent of capacity. The local rail mill will operate for a few days beginning Dec. 15, but will add little to the ingot output of the area. Tin mill production still averages about 45 per cent of capacity, but will decline next week, with suspension at one large plant and sharply curtailed production at another. Sheet and strip steel output is lower, averaging little better than 15 per cent for either product. Valley steel production has declined to 14 per cent, because of the lower schedules of independent mills. Output in the Wheeling district is now estimated at 30 per cent, and will be reduced by lower tin plate requirements in the next two weeks.

First quarter contracting is slow on practically all finished steel products. With prices generally unchanged, consumers are in no hurry to make forward commitments and mills find active solicitation of orders ineffective. Some tin plate contracts have been signed, and price schedules are well maintained. The advance on hot-rolled annealed sheet quotations has received little test.

The raw material markets are extremely dull. Pig iron shipments are lower than they were in November. No mill purchases of scrap have been reported for several weeks. The \$68 ton, seaboard, price on ferromanganese has been reaffirmed for the first half. Heating coke is moving in better volume.

Pig Iron

With shipments this month falling considerably behind those of November and forward purchases entirely lacking, the market continues very dull. Many of the district's foundries are not operating this month, and others are scheduled at only one day a

Pittsburgh steel output is holding at 15 per cent, but Valley and Wheeling district operations have declined.

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First quarter contracting slow on practically all finished steel products.

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Scrap market is dull and weak, but price changes are few.

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week. Low production in radiator and sanitary ware makers' plants is particularly discouraging. Prices are unchanged, with foundry and malleable iron quotable at \$14.50, Valley furnace, and Bessemer at \$15. In the Pittsburgh district all three grades are quoted at the \$15 dollar level. Basic quotations are nominal.

Semi-Finished Steel

No new buying is reported, and shipments to sheet and strip mills are lighter than they were in November. Tin mills have recently increased their requirements slightly. Wire rods are quiet, but some contracting for first quarter at the current price of \$37, Pittsburgh or Cleveland, has been reported.

Rails and Track Accessories

The local rail mill is expected to begin operations before the end of this week. Current orders are sufficient only for a brief run. Specifications for track supplies continue very light and, with the carriers busily engaged in formulating their 1933 budgets, there is little prospect of business in the next three weeks. The Pittsburgh mill will not share in the proposed rail purchases by the Atchison, Topeka & Santa Fe.

Bolts, Nuts and Rivets

The volume of current releases has lost most of the impetus gained in the early fall, and new buying is now very light. Prices are holding fairly well, but forward contracting is light.

Bars, Plates and Shapes

New inquiry and awards of fabricated structural steel have improved in the last few days, although the gain has been accounted for largely by a few outstanding projects. A Pittsburgh fabricator has taken the Cleveland post office, requiring 11,100 tons of steel, but other tonnage taken in this district has amounted to very little. Among the important new jobs is the West Bay anchorage for the

San Francisco-Oakland bridge, requiring 11,000 tons of steel, on which bids will be taken Feb. 2. Construction of the bridge across the Mississippi River at New Orleans is also definitely promised with the final settlement of all adverse litigation. The State of Pennsylvania will take bids Dec. 16 on a considerable tonnage of structural steel and reinforcing bars for highway work, and 250 tons of bars will be required by the Negley Avenue sewer in Pittsburgh. Demand for heavy hot-rolled products from other sources is generally quiet. Inquiry for river craft, numbering 40 to 50 barges and involving 5000 to 7000 tons of steel, is before the trade, but there is no prospect for immediate letting of much of this work. Steel requirements of railroad shops in the district have tapered off considerably, and no new business is coming out.

The current price of 1.60c., Pittsburgh, on bars, plates and shapes has been formally reaffirmed for first quarter, but contract buyers show little disposition to place their forward requirements.

Cold-Finished Steel Bars

With automotive consumers largely covered for the remainder of the month, the market is very dull. Contracting for the first quarter is slow, but the base price of 1.70c., Pittsburgh, is well maintained.

Wire Products

No appreciable change in the rate of demand has been reported in the last week, and tonnage continues very light. Buying by warehouses has almost entirely stopped, and shipments of manufacturers' wire have been running ahead of new business. In announcing first quarter prices on wire products, makers advanced polished and galvanized staples \$3 a ton, and these items are now quoted at 2.65c. and 2.90c. a lb. respectively. Nails are unchanged at \$1.95 a keg, and manufacturers' wire at 2.20c. a lb., Pittsburgh.

Sheets

Incoming tonnage still tends to decline, with all the principal consuming industries reducing their requirements. Absence of specifications from the automotive industry is most pronounced because of recent fairly good demand. While some producers expect the requirements of the Ford Motor Co. to improve in the near future, a further delay in getting out new models seems to be likely. Sheet production has declined to little more than 15 per cent of capacity, with

practically all finishes registering a loss. First quarter prices are receiving little test, but small lots for current delivery are generally bringing the full quoted levels.

Tubular Goods

Current demand for pipe is light, but late November orders have enabled some companies to make comparatively heavy shipments this month. Oil country goods account for most of this tonnage, but mechanical tubing is holding up reasonably well, and boiler tubes are moving at a fair rate. Standard pipe is very quiet, and line pipe projects are lacking.

Tin Plate

While 1933 contracting is still rather light, producers are encouraged by the close adherence to the official price structure. The maximum differential to large buyers is being rigidly observed, and if present price strength continues the realization to mills this year will be much higher than the 50c. a box reduction in the official price would indicate. Production continues at close to 45 per cent of capacity. Large makers in this district who boosted output last week are holding to the higher level.

Strip Steel

Business has declined to a point at which current specifications are only a little higher than they were in July and August. Production has fallen below 15 per cent of capacity, and some mills will run for only a few turns between now and the first of the year. Specifications for shipment in January will not be rolled until after the first of the year, and there is little tonnage coming out for immediate delivery. Prices are receiving little test, but are well held on current tonnage at 1.45c., Pittsburgh, on hot-rolled strip, and 2c., Pittsburgh or Cleveland, on cold-rolled.

Coke and Coal

Demand for domestic coke and coal has been heavier in the last few days, but the other grades are very quiet. Foundry operations this month will continue at a minimum in the district. Furnace coke is moving in a very limited way. Prices are weak, but quotations on domestic coal may be expected to improve if cold weather brings heavier demand.

Scrap

The Pennsylvania Railroad is reported to have sold a little of the No. 1 heavy melting steel offered in its last list to a mill in the district. The price was not disclosed, but is said to have been within the current range of \$8.50 to \$9 for this grade. No mill purchases from dealers have been made, and offering prices are not over \$9. Distress tonnages could easily be picked up at less. Hydraulic compressed sheets are weaker, although no sales are reported. There is practically no demand for the other grades of scrap.

British Pig Iron Sales Are Gaining, More Furnaces Started

Continental Steel Prices Easier as Foreign Demand Slackens—
Luxemburg Plants at 78 Per Cent

LONDON, ENGLAND, Dec. 12 (by cable)—Pig iron demand is improving. There are better sales to the Continent. More furnaces have been started. Steel is dull except in home construction and engineering departments.

Continental iron and steel imported here in November was 58,000 tons, the lowest in several years. New business is stagnant.

Overseas demand for steel has slackened, and prices are easy. Germany reports an increased demand for hoops and bars, but the output exceeds sales, and some mills are rolling for stock. The Belgian market is dull. Luxemburg plants are operating at 78 per cent.

Continental hoop makers are meeting at Brussels Tuesday, and hopes are entertained that an international sales office may operate by the new year.

Tin plate is quiet, but the general position is sound, with output at 55

to 60 per cent of capacity. Mills with good bookings are asking up to 16s. 6d. basis IC, f.o.b. works port, for forward delivery, while a few prompt parcels are offered down to 15s. 6d.

United Kingdom November exports of pig iron were 7800 tons, of which 1060 tons was shipped to the United States. Total United Kingdom November exports of all kinds were 170,000 tons.

Dillinger Huttenwerke in Saar will utilize part of 50,000,000 fr. capital increase to develop tin plate and thin sheet mills.

Federal Building Projects Showing a Letdown

WASHINGTON, Dec. 13.—Steel requirements for Federal Government work are beginning to show a letdown.

One of the largest jobs of the near future will call for about 2500 tons of structural material for a post office at Columbus, Ohio. No date for receiving bids has been set.

On Dec. 20 bids will be received for the administration building of the Veterans' Bureau at San Francisco, calling for about 500 tons.

Bids will be opened Dec. 28 for extension to the post office and court house at San Francisco. Steel requirements for the work are estimated at 800 tons.

A government office building in San Francisco on which bids likely will be asked soon will probably require about 2500 tons.

Bids will be opened Dec. 20 for a post office at Fort Worth, Tex., requiring about 900 tons.

Approximately 300 tons will be needed for the extension and remodeling of the post office at Jersey City, N. J. Bids for this work also will be opened Dec. 20.

Bids will be opened Jan. 12 for a main building and other structures for United States Narcotics Farm, Lexington, Ky., to cost \$3,000,000. The steel tonnage has not been estimated.

The General Electric Co. has announced a new line of full voltage magnetic switches built to the standards of the Underwriters' Laboratories for industrial control equipment for use in hazardous locations where inflammable or volatile liquids, gases, or mixtures are stored, manufactured, used, or handled. These switches are weatherproof as well as being suitable for use in corrosive atmospheres.

British Prices, f.o.b. United Kingdom Ports

	Per Gross Ton
Ferromanganese export	£9
Billets, open-hearth	£4 17s. 6d. to £5 7s. 6d.
Black sheets, Japanese specifications	£10 15s.
Tin plate, per base box	15s. 6d. to 16s. 6d.
Steel bars, open-hearth	£7 17½s. to £8 7½s.
Beams, open-hearth	£7 7½s. to £7 17½s.
Channels, open-hearth	£7 12½s. to £8 2½s.
Angles, open-hearth	£7 7½s. to £7 17½s.
Black sheets, No. 24 gage	£8 5s.
Galvanized sheets, No. 24 gage	£ 15s.

Continental Prices, f.o.b. Continental Ports

	Per Metric Ton, Gold £ at \$4.86
Billets, Thomas	£2 1s.
Wire rods, No. 5 B.W.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
Steel bars, merchant	£2 16s.
Beams, Thomas	£2 6s.
Angles, Thomas, 4-in. and larger	£2 13s.
Angles, small	£2 15s.
Hoops and strip steel over 6-in. base	£3 10s. to £3 10s. 6d.
Wire plain, No. 8	£5 7s. 6d.
Wire nails	£5 10s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Chicago Steel Production Drops Below 10 Per Cent of Capacity

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CHICAGO, Dec. 13.—While steel sales in the past week, including an Illinois Central rail release of 2500 tons and additional requirements of automobile manufacturers, were slightly larger than those of recent weeks, they were not sufficient to prevent a further decline in steel ingot output in this district, which is now at slightly under 10 per cent. Current rollings have also been aided by the release of 7500 tons of rails by the New York Central.

Most transactions are for immediate shipment, interest in forward commitment being very small. The outlook for the remainder of the month is not good. As steel companies now view the situation, the holiday shutdown will take in the entire week between Christmas and New Year's.

Building in the Chicago area is near an all-time low, and few new projects are being figured. The Randall Tower, requiring about 50,000 tons of steel, is still alive, but its fate may be decided this week. Plans for brewery construction and repairs are under way, but from all present indications no major moves will be made until some definite action is taken by Congress.

Of interest in the scrap market is the sale to a scrap dealer of 2000 unserviceable cars by the St. Louis-San Francisco. Many foundries are now down for the remainder of the year, and scrap movement in all directions is very light.

Bolts, Nuts and Rivets

First quarter contracting is progressing satisfactorily. Spot buying is at a standstill, while most consumers await the turn of the year.

Pig Iron

December shipments of Northern foundry iron are running about 20 per cent below the November average. Spot sales are light and forward commitments are at the level of the last three weeks. Consumers' interest in entering releases for January delivery is extremely light and yet foundrymen are inclined to believe that the melt will gain ground soon after the new year starts.

Rails and Track Supplies

Rail releases have been somewhat more liberal, and one local mill will be able to continue its present low rate of output for the next three to four weeks. The Illinois Central has contracted for 2500 tons, 1000 tons having been taken by Inland Steel

Chicago steel sales slightly better than in recent weeks, but production declines.

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Shutdowns of steel-making capacity between Christmas and New Year's in prospect.

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Scrap movement is very light, but most prices are holding at recent levels.

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Co. and 1500 tons by Illinois Steel Co. Not more than 25 per cent of the Santa Fe tonnage is expected to come to this territory. The bulk will go to the Colorado mill.

Structural Material

Building in the Chicago area is near an all-time low, and inquiries of the size that would lend real assistance to change this situation are almost wholly lacking. It is quite noticeable that both Federal and State work is becoming measurably lighter in the Middle West. With one or two exceptions, inquiries for bridge work are widely scattered over many States and are for small individual tonnages. Some brewery projects are in the making, but it is too early to ascertain the tonnages involved.

Plates

A few small scattered lots of plates are being sought for repairs to brewery equipment. Otherwise this market has shriveled almost to the vanishing point. Oil country needs are at the low point of the year, and there is no prospect of immediate improvement.

Sheets

Most hot mills in this district are now waiting until near the middle of the week in the hope that business will pile up sufficiently to permit two or three turns. Interest in forward commitments is very sluggish and the character of spot sales is clearly indicated by the rate at which mills can operate.

Cast Iron Pipe

Even carload orders are a rarity as near-zero weather grips most of the Central States. The water plant project at Wilmette, Ill., is the only work of size that may soon come out for figures. A group in that village threatens to have work halted by court order, but the belief is rather general that this move will fail. Although there has been some talk

about naming special winter prices, no action has as yet been taken in that direction.

Wire Products

Demand continues to slacken, and December shipments are already well below the November average. Consumers in the manufacturing trade are giving special attention to inventories in order that they may reduce to the bone taxes levied against stocks on hand. Jobbers are taking the same attitude. The blight of low prices for farm products is holding that market in check.

Bars

Most sources of orders are drying as the year-end approaches. Automobile manufacturers are the most active group in the market, and farm implement builders make a poor second. Forward buying is unusually low.

Warehouse Business

New low prices are now being offered on hot-rolled No. 10 gage, galvanized and hot-rolled annealed No. 24 gage sheets. The downward drift in demand from warehouses is lower than the usual seasonal trend, and there are a few bright spots in the market that a month ago had not been anticipated.

Reinforcing Bars

Great activity is being shown by the outgoing state administrations in Illinois and Indiana in the way of rushing through road programs. The Indiana Highway Department is placing contracts this week for paving that will take 900 tons of bars, and the Illinois program is several times as large. In so far as dealers are concerned, both awards and inquiries are very low. An order for a few tons is a rarity. Prices remain weak, especially so when delivery is for territory south of Chicago.

Scrap

This market is moving sluggishly. A mill that discontinued taking scrap several weeks ago may again take a few cars. Sales are at a standstill all along the line. Railroads are stiffening their ideas about prices, but yard operators are eying carrying charges on scrap on hand and in most cases are rather anxious to turn over some of their tonnages. With the possibility that steel furnaces may be idle during most if not all of the holiday week, dealers are inclined to expect little business until a definite upturn in ingot output takes place.

Eastern Pennsylvania Steel Output Has Declined Slightly

Production at 13 Per Cent in Sluggish Market—Scrap Prices Lower—Japanese Pig Iron Imported

PHILADELPHIA, Dec. 13.—The market remains sluggish, having shown no improvement the past week. Steel works operations have declined about one half point to 13 per cent of capacity as the result of the closing down by an eastern Pennsylvania plant of its only active furnace. It will resume Jan. 1 and meanwhile steel will be rolled from accumulated ingots.

An unusual importation into this district in November consisted of 2040 small ingots from Germany. Raw steel imports into the United States are generally negligible.

Pig Iron

Demand is extremely light. Only carlots are moving. Imports into the Philadelphia district in November totaled 6949 tons, of which 6383 tons was Royal Dutch and 566 tons was Indian iron. About 500 tons of Japanese iron is expected at this port the latter part of the month. Of this quantity, 100 tons will go to a pipe works on the Delaware River as a trial order. The remainder will be offered for sale by the New York importers having charge of Japanese shipments.

Plates, Shapes and Bars

The McClintic-Marshall Corp'n. has been awarded the fabricating work for the Philadelphia Customs House, requiring 6550 tons of structural material. Award of 1500 tons of reinforcing bars for the Archives Building in Washington went to the Capital Fireproofing Co. of that city. Railroad buying is at a standstill. It is reported that the Reading Railroad still has releases of about 1000 tons of steel for that many cars in connection with its 3000-car repair program. Awards made for this work in December have totaled about 500 tons, all of which went to eastern Pennsylvania mills. Bids for cruiser No. 39, requiring 6000 to 8000 tons of plates, will be opened tomorrow in Washington. A nearby plate mill will be started up tomorrow and run the remainder of the week and possibly longer.

Sheets

Production of two-door Plymouth bodies by the Edward G. Budd Mfg. Co. will not begin in volume until about the middle of next month, it is reported. The result has been deferment of sheet and strip orders, which are not expected to be placed in important quantities until the first of the new year. The market is quiet.

Scrap

Several grades have shown further softening. Carwheels have declined 50c. a ton to \$8.50 at which a fair-sized tonnage has been sold to a nearby mill.

Buffalo Steel Output Reduced; Pig Iron Dull

BUFFALO, Dec. 13. — Carload orders for spot shipment constitute the principal items of pig iron business. On the small amount of Eastern business that is being done, foreign and eastern Pennsylvania competition is too strong for furnaces in the Buffalo districts. Furnacemen hear reports that foreign makers will establish storage yards in the East. One Lackawanna furnace and one Republic furnace are in blast, but the latter is on slow production.

Steel-making operations at the Lackawanna plant of Bethlehem Steel have been reduced to three open-hearth furnaces. Republic Steel is operating two, but they may not continue through the week. Wickwire Spencer is operating one open-hearth.

The scrap market continues quiet. With operations at steel mills dwindling, chances of extensive buying before the end of the year are diminishing.

Alabama Blast Furnace Output to Be Reduced

BIRMINGHAM, Dec. 13.—Pig iron shipments having sagged steadily downward since the middle of October, local merchant furnaces can see but very little tonnage in sight for the next several weeks. Present yard stocks are more than sufficient for any needs that may arise, so there will be a considerable reduction in furnace operations over the holidays. Woodward Iron Co., which has been operating two furnaces on foundry iron for several months, will bank both furnaces on Dec. 15 and cease all other activities. Its present plan is to resume work some time in January. Republic Steel Corp'n., with one furnace active, will also bank it around the 15th. Republic Steel likewise hopes to start again early in January. How soon resumption of production may begin will depend largely on the market outlook next month. After this week there will be only two active

blast furnaces in this district, and it is possible that one of these may be banked over the holidays. The market is still as it has been for weeks, with only a small amount of new business, mostly all spot, and with shipments also small and irregular. Quotations of \$11 for the Southern market and \$10 for the North are still in effect.

Steel

For several weeks new tonnage has varied but little, being confined to routine requirements. Federal buildings and road construction occasionally bring in some additional tonnages but even these are limited at present. From this week on until early January, bookings are expected to be even more reduced. Prices are unchanged. Last week there were five active open-hearths and the same number is scheduled for this week.

Scrap

Buying is almost at a standstill. Even contract shipments have dropped to a low point.

Oregon Bridge May Be Financed by R. F. C.

SAN FRANCISCO, Dec. 12.—Few steel contracts are being placed, and there are few calls for bids. The general building trade was heartened by the report that building permits on the Pacific Coast in November showed an increase for the fourth consecutive month with an actual increase for the month over November, 1931.

The Shell Oil Co. has announced an \$8,000,000 improvement and extension program for the coming year. Application has been made for a \$6,000,000 loan from the R. F. C. to be used for a bridge across the Columbia River at Astoria, Ore. This project will require approximately 9000 tons of structural steel and an unannounced tonnage of reinforcing bars.

Builders have been interested in the announcement of a \$20,000,000 merger of four important cement companies in northern California, the plans for which have been tentatively completed.

Bids have been called in Seattle on an 8½-mile pipe line with alternatives of wood, steel, reinforced concrete and cast iron pipe.

Bids have been called for Dec. 27 for furnishing 450 tons of rails and 85 tons of bolts and spokes for jetties at Yaquina Bay in Lincoln County, Ore.

Carrier Engineering Corp'n., Newark, N. J., has secured a large contract for installation of air conditioning system in new buildings at Rockefeller Center, Inc. (Radio City), New York, totaling over \$1,000,000, with refrigerating equipment equivalent to 3,000,000 lb. ice per day, 15 miles of ducts, 1000 outlet fixtures, and accessories.

Cleveland Steel Output Lifted By Automobile Requirements

Addition of One Open-Hearth Brings Rate Up to 29 Per Cent—
New Motor Car Buying Expected

CLEVELAND, Dec. 13. — While the demand for finished steel still shows a downward tendency, the volume of business during the week was fully up to expectations, considering the approaching inventory time and holiday season, and the tonnage was in excess of that placed during the summer months.

A local mill with considerable automobile tonnage on its books has put on an additional open-hearth furnace, increasing the output in Cleveland three points this week to 29 per cent of capacity.

Additional business in sheets and strip steel has been placed by automobile manufacturers, and an increase in tonnage from this source is expected during the next week or two, as this industry thus far has purchased little steel for January delivery. Automobile manufacturers who are bringing out new models evidently are planning to continue production with little interruption during the holiday period, as they are anxious to build enough cars to stock dealers as soon as possible. Makers of forgings and other automobile parts are not being benefited much by the increased activity in the motor car field, as automobile companies that are the most active are having the bulk of their parts made in their own or allied plants.

Railroads in this territory have not yet closed for steel for their first quarter miscellaneous requirements, for which they have inquiries out, and no new rail business is in prospect in the near future.

Prices on plates and shapes have been reestablished at 1.60c., Pittsburgh, for the first quarter, following the recent reestablishment of the 1.65c., Cleveland, bar base. Sheet bars, billets and slabs have been reestablished for the coming quarter at \$26, Cleveland, Pittsburgh and Youngstown, and present prices on cold-finished steel have been reaffirmed. With these price extensions, practically all current prices except on No. 24 gage hot-rolled annealed sheets have been reaffirmed for the coming quarter. Few contracts for the quarter have been closed.

Pig Iron

Some interest is being taken in first quarter contracts, as is indicated by the report of one producer that it has received two inquiries from Ohio jobbing foundries for sizable lots for

that delivery. Sales are light and all in small lots. While an increase in shipments to the motor car industry is being maintained this month, there is a seasonal slackening in the demand from other sources. Suspension of operations by many foundries over the holiday period is expected. Prices are unchanged and, while current quotations have not been tested on round lot business, producers will try to hold to these for the first quarter.

Iron Ore

Dock balance of Lake Superior ore Dec. 1 was 5,191,114 tons against 6,048,327 tons on the same date a year ago. Receipts at Lake Erie ports during the season were 2,707,548 tons against 14,756,430 tons during 1931. Shipments from these ports until Dec. 1 were 2,478,191 tons compared with 11,013,268 tons during the same period last year. Receipts this year at other than Lake Erie ports were 824,759 tons. Last year they were 14,337,329 tons.

Bars, Plates and Shapes

The Cleveland Post Office, requiring 11,200 tons of structural steel, and two additional Ohio bridge jobs, one at Woodville, 230 tons, and a bascule bridge at Port Clinton, 530 tons, have been placed. Only a small tonnage is listed in new State work, for which bids will be taken Dec. 23. Garbage incinerators in Detroit will require 1100 tons. A request for bids for the Columbus Post Office will be advertised shortly. A Cleveland contractor is low bidder for a State dam in Springfield, Ill., requiring 600 tons of reinforcing bars. Merchant bars are moving only in small lots.

Strip Steel

Some new business in hot-rolled strip has been placed by leading makers of automobile accessories, but specifications against this tonnage have not been released. The market is firm at 1.45c., Pittsburgh. Cold-rolled strip is quoted at 1.90c. to 2c., Cleveland.

Sheets

Orders are very light and confined to immediate needs. There is some local demand for auto body seconds. While not much interest is being shown in first quarter commitments, a few contracts have been placed for that period. The seasonal demand from the stove industry has tapered. Outlook for steel requirements from the

refrigerator industry in 1933 is not regarded as promising, as some manufacturers are reported to have large stocks. Orders are still being taken for black sheets at 2.10c., but this price may be withdrawn shortly because of the announced advance to 2.20c. for the first quarter.

Cold-Finished Steel Bars

Present prices have been reaffirmed for the first quarter. These are 1.70c., Pittsburgh; 1.75c., Cleveland, Buffalo and Chicago, and 1.90c., Detroit. Demand continues slack.

Scrap

A local consumer continues to take small shipments of heavy melting steel scrap, and a small tonnage was released this week by a Youngstown mill. Consumers are reducing their inventories and no new buying is looked for this month. Prices are unchanged.

Tariff Hearing Jan. 12 On Cotton Ties

WASHINGTON, Dec. 13.—A hearing on the petition of the American Iron and Steel Institute for a 50 per cent increase in the duty of 25c per 100 lb. on cotton ties will be held before the Tariff Commission in Washington on Jan. 12. This is one of numerous petitions filed by the institute in behalf of the American steel industry to get added protection against low-priced imports, especially those from Continental European countries, some of which pay very low wages.

The institute also is seeking anti-dumping relief from the Bureau of Customs, where numerous cases are pending. Proof of dumping under the American law, however, is difficult and so far the only action taken by the bureau is to find suspected dumping in the cases of wire netting from Germany and channels and bars from the Saar Basin. Apparently, however, the lowest priced material comes from Belgium and Luxembourg.

The difficulty of operating quickly and effectively under the anti-dumping law has brought suggestions for giving it more teeth, together with further raising of duties under the Hawley-Smoot act, propaganda to the contrary notwithstanding. However, there is little prospect of such action and it is a question even if relief will be given by legislation offsetting the effect of depreciated currency.

Stephens-Adamson Mfg. Co., Aurora, Ill., has acquired rights to manufacture and distribute in the United States the Redler conveyor. This equipment, developed in England, is claimed to convey horizontally, vertically, up inclines and around corners.

New York Construction Work Being Figured in Larger Volume

More Private Projects in Offices of Engineers and Architects—
Bids on Federal Court House Jan. 6

NEW YORK, Dec. 13.—A large volume of private building work is reported to be in the hands of engineers and architects, but most of this will not come into the steel market until early next year. Bids have been requested by Jan. 6 on the Federal Court House, New York, which will take 9000 tons of structural steel. The McClintic-Marshall Corp., was awarded 2300 tons of fabricated material for a New York State hospital at Kings Park, N. Y. About 1200 tons of plates to be fabricated into pipe for a Washington job by the Alco Products Co., Inc., Dunkirk, N. Y., subsidiary of the American Locomotive Co., has been ordered. These are the only projects of size that have come into the New York steel market in the past week. The general run of orders is extremely light.

A few tin plate contracts have been signed, but many tin plate users are holding off. On such contracts as have been signed, specifications for initial shipments the first week of January have been given. A few miscellaneous steel orders have also been placed with the same proviso. Consumers and jobbers do not want steel shipped this month unless they have an immediate use for it.

There is very little test of prices, which are fairly well maintained except on plates. A large plate order went at a concession of several dollars a ton.

Pig Iron

Small-lot trading continues to prevail in this market. That buyers are still reluctant to cover beyond immediate melting needs is indicated by last week's sales volume of only 1000 tons for the district, comparing with a like amount the week before and 1300 tons two weeks ago. Foundry operations are estimated to be at the lowest point since the summer. Although there is a natural expectation of brisker activity in the first quarter, some foundries are viewing future prospects with little hope of early improvement. This attitude is reflected by certain larger foundries which have recently installed smaller cupolas in order to adjust operating schedules to current restricted calls for castings. While the lack of buying precludes a test of prices, domestic furnace schedules are still subject to competitive influence of foreign offerings. A recent competitive factor along the seaboard is the offering of Japanese iron at low prices. A 100-ton lot of this metal was delivered recently to a

Delaware River pipe foundry.

Reinforcing Bars

Extremely light demand for bars reflects the year-end dwindling in construction activity. Fresh specifications fail to reveal important tonnage, and lettings are also in restricted volume. The largest award of the week involved only 140 tons for nurses' quarters at the Veterans' Administration Hospital, New York. The mill price of 1.75c., Pittsburgh, or 2.10c., delivered New York, is fairly steady for small tonnages.

Scrap

Consumptive demand has been checked further by prospective holiday shutdowns at Eastern mills. Despite the dearth of buying, prices are apparently resisting downward tendencies. Brokers are bidding \$4 to \$4.50 a ton, on barge, for No. 1 heavy melting steel, and \$3 on barge for No. 2 steel, both grades still being loaded for export. Movement of cast scrap is particularly light.

St. Louis Scrap Declines; Some Pig Iron Bought

ST. LOUIS, Dec. 13.—A round tonnage of foundry iron was bought by a manufacturer in the St. Louis trade territory who caters to the agricultural industry. Jobbing foundries are looking forward to a marked revival in business in brewery machinery, supplies and equipment if the manufacture and sale of beer are legalized. The stove foundries in the district are all virtually closed down until after Feb. 1, their active season having lasted about two and a half months. A malleable foundry in the district has bought sufficient iron to make automobile parts for 60 to 90 days.

Steel

While prices of plates, shapes, bars and sheets continue firm, very little new business is coming through. In Oklahoma, work on highway projects requiring a heavy tonnage of structural steel and reinforcing bars and on which awards have been made, is being held up on account of improper financing. In Texas, the temporary injunction which had been obtained by Governor-elect Ferguson against making awards on highway projects

has been dissolved. The structural trade is extremely dull, the district fabricators working at an average of about 20 per cent of capacity.

Scrap

A leading consumer in the district has come into the market for miscellaneous rails, bolsters, steel wheels, etc., at prices ranging from 25c. to \$1 a ton less than were paid on its preceding purchase, otherwise the market is stagnant. Selected heavy and No. 1 heavy melting steel, miscellaneous standard-section rails and cast iron car wheels are 50c. lower, while railroad springs and wrought iron bars and transoms are \$1 off. Railroad lists: Southern, 4500 tons; Kansas City Southern, 190 tons; New York, Chicago & St. Louis, 20 carloads.

First Quarter Pig Iron Sold at Cincinnati

CINCINNATI, Dec. 13.—An order for 500 tons of Northern foundry iron from an Indiana melter the past week renewed interest in first quarter business. Spot demand, however, was small, the total being about 300 tons. Inquiry is nil. One or two stove foundries are still melting a fair amount of iron, but the majority of foundries are pooling business to keep a few plants engaged on a couple of heats a week. Pig iron quotations are unchanged.

Steel

Moderate activity in the automotive field is producing some sheet demand, but other industries are not taking appreciable amounts. First quarter business is lacking.

Scrap

While mills are accepting some material on old contracts, new business is on a hand-to-mouth basis. Dealers' bids are unchanged, but nominal.

Pig Iron Sales a Little Larger in Boston

BOSTON, Dec. 13.—Pig iron sales were a little larger the past week, but in the aggregate did not exceed 1000 tons. One 300-ton lot was sold, as well as four or five carlots and truckloads. The Mystic Iron Works secured most of the business. The General Fire Extinguisher Co., Auburn, R. I., did not close on its 1250-ton inquiry. On the 500-ton lot for its Rhode Island plant, Dutch interests have made a low quotation. Mystic Iron Works' December shipments will show an increase over November.

Most scrap brokers are without orders, consequently prices are largely nominal. Because of lack of orders, weakness in No. 1 heavy melting steel at other centers is not reflected here.

Fabricated Structural Steel

Awards Total 35,600 Tons—New Projects Aggregate 40,000 Tons

STRUCTURAL steel awards, at 35,600 tons, are the largest in many weeks and compare with a total of 10,067 tons for a week ago. The bulk of the tonnage placed during the week was accounted for by four public projects—a Cleveland post office, 11,200 tons; a Federal Archives building at Washington, 7500 tons; a customs house at Philadelphia, 6550 tons; and a post office at Norfolk, Va., 2000 tons. New projects, which also include several large public undertakings, total 40,088 tons, compared with 7300 tons a week ago.

NORTH ATLANTIC STATES

Revere, Mass., 130 tons, Beach Street bridge, to New England Structural Co.

Springfield, Vt., 112 tons, State bridge, to McClinton-Marshall Corp.

Albany, N. Y., 135 tons, bin hoppers, to Lackawanna Steel Construction Corp.

Kings Park, N. Y., 2300 tons, State hospital, to McClinton-Marshall Corp.

Jamaica, N. Y., 850 tons, inspection shed, to Lehigh Structural Steel Co.

Philadelphia, 6550 tons, Customs House, to McClinton-Marshall Corp.

Pennsylvania Railroad, 230 tons, bridge at Merchantville, N. J., over State highway route 40, to Phoenix Bridge Co.

Washington, 7500 tons, Federal Archives building, to McClinton-Marshall Corp.

SOUTH AND SOUTHWEST

Norfolk, Va., 2000 tons, post office, to Fort Pitt Bridge Works.

Alexandria, La., 250 tons, post office, to Petroleum Iron Works.

Beaumont, Tex., 435 tons, post office, to Petroleum Iron Works; previously reported to Connors Steel Co.

Osage County, Okla., 100 tons, bridge, to Capitol Steel & Iron Co.

CENTRAL STATES

Cleveland, 11,200 tons, post office, to Fort Pitt Bridge Works Co.

Woodville, Ohio, 230 tons, State bridge, to McClinton-Marshall Corp.

Port Clinton, Ohio, 530 tons, State bridge, to R. C. Mahon Co.

State of Wisconsin, 100 tons, bridge, to Wausau Iron Works.

Omaha, Neb., 1000 tons, post office, to Wisconsin Bridge & Iron Co.

Santa Fe Railroad, 125 tons, furnace retorts, to American Bridge Co.

WESTERN STATES

Holly, Colo., 750 tons, bridge, to McClinton-Marshall Corp.

Alameda, Cal., 250 tons, eight units at Government Island, to Herick Iron Works.

Nyssa, Ore., 395 tons, gates and hoists for tunnel No. 1 on Owyhee project, to Hardie Tynes Co. and American Locomotive Co.

San Diego County, Cal., 166 tons, State highway bridge across Viejas Creek, to Consolidated Steel Corp.

Boundary County, Idaho, 680 tons, State highway at Bonners Ferry, to Pittsburgh-Des Moines Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Newton, Mass., 100 tons, State bridge.

Jersey City, N. J., 300 tons, extension and remodeling of post office; bids Dec. 20.

Concord, N. H., 550 tons, State highway bridge.

New York, 9000 tons, Federal court house; bids Jan. 6.

New York, 1100 tons, viaduct for New York Central Railroad from Bank to Bethune Street.

Baltimore & Ohio, 750 tons, grade crossing elimination at Dungan Hills and Grassmere, Staten Island.

Gowanda, N. Y., 2500 tons, State Homeopathic Hospital.

Callicoon, N. Y., 625 tons, State highway bridge.

Elmira, N. Y., 250 tons, State reformatory buildings.

Comstock, N. Y., 200 tons, Great Meadow prison.

Philadelphia, 2900 tons, Naval hospital; John McShain, Philadelphia, low bidder. Bid exceeded appropriation and new tenders may be asked or special appropriation provided.

SOUTH AND SOUTHWEST

Louisville, Ky., 500 tons, lock and dam No. 5 on Green River.

Caryville, Fla., 550 tons, highway bridge.

Lexington, Ky., tonnage not estimated, main building and structures for United States narcotics farm; to cost \$3,000,000.

Fort Worth, Tex., 900 tons, post office; bids Dec. 20.

CENTRAL STATES

Detroit, 1100 tons, four garbage incinerators for a municipal plant; bids close Jan. 18.

Sidney, Ohio, 250 tons, State highway bridge.

State of Indiana, 1000 tons, highway bridges.

State of Illinois, 1400 tons, highway bridges.

Springfield, Ill., 150 tons, filter plant, Hecker-Moon Co., Cleveland, low bidder.

Cedar City, Mo., 250 tons, bridge.

State of Ohio, 100 tons, highway bridge in Shelby County; bids Dec. 23.

Columbus, Ohio, 2500 tons, post office.

WESTERN STATES

Routt County, Colo., 238 tons, State highway bridge between Hayden and Mount Harris; bids Dec. 22.

Denver & Rio Grande Western Railroad, 1500 tons, bridges.

San Francisco, 500 tons, administration Building of Veterans Bureau; bids Dec. 20.

San Francisco, 800 tons, extension to post office and court house; bids Dec. 23.

San Francisco, 2500 tons, Government office building.

San Francisco, 11,000 tons, West Bay anchorages for Trans-Bay bridge; bids Feb. 2.

State of California, 400 tons, highway bridge over Sacramento River at Knights Landing.

FABRICATED PLATE AWARDS

Bremerton, Wash., 100 tons, steel lined tunnel at Puget Sound Navy Yard, to an unnamed bidder.

Augusta, Kan., 135 tons, tank for White Eagle Oil Corp., to Structural Steel Co.

NEW PROJECTS

Mare Island, Cal., 200 tons, for four 1000-hp. boilers, specification 7119; bids close Dec. 21.

Seattle, Wash., 150 tons, tank on Seventeenth Avenue.

Reinforcing Steel

Awards 4147 Tons—New Projects 4400 Tons

West Point, N. Y., 105 tons, addition to cadet hospital, to Concrete Steel Co.

New York, 140 tons, nurses' quarters, Veterans' Administration Hospital, to Fireproof Products Co.

Lodi, N. J., 100 tons, high school, to Truscon Steel Co.

Cleveland, 1365 tons, Brook Park bridge, to Truscon Steel Co.

Washington, 1500 tons, Federal Archives building, to Capital Fireproofing Co., Washington.

Globe, Ariz., 132 tons, Show Low State highway, to Colorado Fuel & Iron Co.

San Simeon, Cal., 124 tons, two bridges over Pice Creek, to Truscon Steel Co.

Ventura County, Cal., 162 tons, State highway structure, at Hueneme, to Soule Steel Co.

Boundary County, Idaho, 164 tons, State highway bridge at Bonners Ferry, to Pacific Coast Steel Co.

Reno, Nev., 116 tons, post office, to Sheffield Steel Co.

San Francisco, 185 tons, Best Foods store, to Soule Steel Co.

Vallejo and Napa, Cal., unstated tonnage, post offices, to Concrete Engineering Co.

NEW REINFORCING BAR PROJECTS

Enfield-Ware, Mass., 800 tons, caisson core, Metropolitan Water District.

Bernardsville, N. J., unstated tonnage, sewage treatment plant.

Philadelphia, 900 tons, Naval hospital; John McShain, Philadelphia, low bidder. Bids exceed appropriation; new bids may be asked.

Carlisle, Pa., unstated tonnage, United States barracks; Crescent Heating & Plumbing Co., Louisville, Ky., low bidder.

Pittsburgh, 250 tons, Negley Avenue sewer; General Contracting Corp., general contractor.

State of Ohio, 200 tons, miscellaneous bridge jobs; bids to be taken Dec. 23.

Springfield, Ill., 600 tons, State dam, Hecker-Moon Co., Cleveland, low bidder.

Fort Miley, Cal., 1500 to 2000 tons, 11 buildings, bids to be called Dec. 20.

San Diego County, Cal., 163 tons, two State highway bridges over Cudaby Channel and Tecolote Creek; bids Dec. 28.

State of Oregon, 100 tons, State highway bridges in four counties, bids called Dec. 14.

State of Montana, 100 tons, State highway bridges in five counties, bids called Dec. 15.

Pipe Lines

Southwestern Gas & Pipe Line Co., Eden, Tex., I. C. Watson, Eden, head, plans steel pipe line for natural gas service at Eden and vicinity. Work is scheduled to begin early in 1933. Franchise also has been secured from Board of County Commissioners for pipe lines for gas supply at Millersview, Paint Rock and other points in county.

Charles Anderson, Van Wert, Ohio, is at head of project to build steel pipe line for local natural gas supply. Line about 10 miles long will be built from gas fields in Paulding County to city. Cost about \$70,000.

Liquified Natural Gas Co., Foshay Tower Building, Minneapolis, plans installation of steel pipe line for service at Tracy, Westbrook, Currie, Minn., and vicinity.

Copper Falls to Record-Low Price Level; Year-End Inertia Grips All Metals

NEW YORK, Dec. 13.—Failure of the international conference of producers to effect further agreement governing next year's copper output has accentuated unsettlement in the industry. Just what steps will be taken by the Roan Antelope and Katanga interests, whose rigid claims brought about the impasse at the conference, to actuate their threats to increase production in 1933 have not yet been definitely stated. American producers, though not officially defining their position, are understood to be in accord for a continuance of the present agreement restricting output to 20 per cent of capacity. In any event most producers will undoubtedly await untanglement of current world economic and debt problems before definitely shaping future production programs. As a result of the conference failure and lack of buying support, the Connecticut price of electrolytic fell last week to a record low level of 5c. a lb. Metal at that price is available for delivery through first quarter, while 5.12½c. obtains for second quarter. In foreign markets electrolytic was sold

during the week from 5.15c. down to today's posting of 4.87½c., c.i.f. Continental ports. Copper Exporters, Inc., are quoting 5c. According to estimates, world copper stocks decreased about 10,000 tons during November, making a shrinkage of about 2500 tons in the past five months.

Tin

Trading in this market is virtually at a standstill. Spot buying has practically vanished, probably as a result of the unsettling influence of sterling fluctuations on the dollar price of tin. While slight recovery in sterling exchange last week pushed the New York price up to 22.75c. a lb., today's quotation of 22.55c. reflects no net change for the week. London values fell during the week, with today's posting £149 12s. 6d. a ton for spot standard, £150 15s. For future standard and £155 5s. for spot Straits. The market in Singapore was also lower today at £154 15s. Straits shipments up to and including Dec. 10, aggregated 1606 tons. United Kingdom warehouse stocks fell 134 tons last week to 30,140 tons.

Lead

Though inquiry during the past week was somewhat brisker than that in the preceding period, consumer interest is generally lagging. Contracting for January requirements is particularly light. This condition, however, may be ascribed to reluctance of consumers to specify needs for that month until after inventory period. The leading mid-Western producer last week adjusted its price position to 2.87½c. a lb., St. Louis, to meet competition. The New York contracting basis is unchanged at 3c.

Zinc

The inertia that has gripped this market continues to prevail. As in other markets, resumption of activity in zinc is not expected until after the close of the year. In the absence of trading factors, prices show no trend and are unchanged at 3.12½c., East St. Louis, and 3.49½c., New York. Prices in the Joplin ore market are steady at \$17 for flotation and \$18 for coarse grade.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 7	Dec. 8	Dec. 9	Dec. 10	Dec. 12	Dec. 13
Lake copper, New York	5.12½	5.12½	5.00	5.00	5.00	5.00
Electrolytic copper N. Y.*	4.75	4.75	4.75	4.75	4.75	4.75
Straits tin, spot, N. Y.	22.75	22.62½	22.50		22.70	22.55
Zinc, East St. Louis	3.12½	3.12½	3.12½	3.12½	3.12½	3.12½
Zinc, New York	3.49½	3.49½	3.49½	3.49½	3.49½	3.49½
Lead, St. Louis	2.87½	2.87½	2.87½	2.87½	2.87½	2.87½
Lead, New York	3.00	3.00	3.00	3.00	3.00	3.00

*Refinery quotation; price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.

Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.

Antimony, 5.40c. a lb., New York.

Brass ingots, 85-5-5-5, 5.50c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	24.50c. to 25.50c.
Tin, bar	26.50c. to 28.50c.
Copper, Lake	7.50c. to 8.50c.
Copper, electrolytic	7.25c. to 8.25c.
Copper, casting	7.00c. to 8.00c.
*Copper sheets, hot-rolled	15.37½c.
*High brass sheets	12.50c.
*Seamless brass tubes	15.25c.
*Seamless copper tubes	14.37½c.
*Brass rods	10.25c.
Zinc, slabs	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	3.75c. to 4.25c.
Lead, bar	5.25c. to 6.25c.
Lead, sheets	6.75c.
Antimony, Asiatic	8.00 to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	16.00c.
Solder, ½ and ⅓	15.50c. to 16.50c.
Babbitt metal, commercial grade	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	26.50c.
Tin, bar	28.50c.
Copper, Lake	6.25c.

Copper, electrolytic	6.25c.
Copper, casting	6.75c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	3.75c. to 4.00c.
Lead, bar	7.25c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	16.50c.
Babbitt metal, high grade	30.50c.
Solder, ½ and ⅓	16.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	3.75c.	4.25c.
Copper, hvy. and wire	3.50c.	4.125c.
Copper, light and hot-toms	2.625c.	3.375c.
Brass, heavy	1.75c.	2.25c.
Brass, light	1.25c.	1.75c.
Hvy. machine composition	2.50c.	3.125c.
No. 1 yel. brass turnings	2.125c.	2.50c.
No. 1 red brass or compos. turnings	2.375c.	3.00c.
Lead, heavy	2.25c.	2.50c.
Zinc	1.25c.	1.625c.
Cast aluminum	3.75c.	5.25c.
Sheet aluminum	8.00c.	9.50c.

Machine Tool Orders Gain in November

Machine tool orders gained in November, according to the monthly report of the National Machine Tool Builders' Association. The index figure for last month is 32 compared with 27.4 for October, that month having shown a decline following a consecutive rise in the two preceding months. The three-months' moving average of the association has also advanced to 29.6 from 28.3 in October.

Unfilled orders at the end of November stood at 42.2 against 39.9 a month before, while shipments during last month are rated at 28.9 against 44.4 in October, a sharp drop which suggests that many of the orders placed in the past month are for delivery after Jan. 1.

Detroit Scrap Weak

DETROIT, Dec. 13—With the exception of a few items which have declined 25c. a ton, scrap prices have not changed the past week. However, in the absence of consumer buying they are largely nominal. More scrap is coming on to the market due to increased automobile production, although the Chrysler Corp. still is holding its material rather than selling it at current levels.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	Base per Lb.
P.o.b. Pittsburgh mill	1.60c
P.o.b. Chicago	1.70c
P.o.b. Philadelphia	1.91c
P.o.b. New York	1.95c
P.o.b. Detroit	1.80c
P.o.b. Cleveland	1.65c
P.o.b. Lackawanna	1.70c
P.o.b. Birmingham	1.75c
C.I.F. Pacific ports	2.10c

Billet Steel Reinforcing

(as quoted by distributors)	
P.o.b. P'gh mills, 40, 50, 60-ft.	1.60c
P.o.b. Birmingham, mill lengths	1.75c
P.o.b. Cleveland	1.60c

Rail Steel

P.o.b. mills, east of Chicago dist.	1.35c
P.o.b. Chicago Heights mills	1.50c

Iron

Common iron, f.o.b. Chicago	1.60c
Refined iron, f.o.b. P'gh mills	2.75c
Common iron, del'd Philadelphia	1.85c
Common iron, del'd New York	1.90c

Tank Plates

Base per Lb.	
P.o.b. Pittsburgh mill	1.60c
P.o.b. Chicago	1.70c
P.o.b. Birmingham	1.75c
P.o.b. Cleveland	1.80c
P.o.b. Philadelphia	1.91c
P.o.b. Cincinnati	1.70c
P.o.b. Sparrows Point	1.70c
P.o.b. New York	1.85c
C.I.F. Pacific ports	2.00c
Wrought iron plates, f.o.b. P'gh.	3.00c

Structural Shapes

Base per Lb.	
P.o.b. Pittsburgh mill	1.60c
P.o.b. Chicago	1.70c
P.o.b. Birmingham	1.75c
P.o.b. Lackawanna	1.70c
P.o.b. Bethlehem	1.70c
P.o.b. Cleveland	1.80c
P.o.b. Philadelphia	1.91c
P.o.b. New York	1.95c
C.I.F. Pacific ports (standard)	2.10c
C.I.F. Pacific ports (wide flange)	2.20c

Steel Sheet Piling

Base per Lb.	
P.o.b. Pittsburgh	1.90c
P.o.b. Chicago mill	2.05c
P.o.b. Buffalo	2.00c

Alloy Steel Bars

Alloy	Base per Lb.
P.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton	
S.A.E. Alloy	
Standard Quantities Bar Base, 2.45c. per Lb.	
Numbers	per 100 lbs.
2000 (1% Nickel)	\$0.25
2100 (1% Nickel)	0.55
2300 (3% Nickel)	1.50
2500 (5% Nickel)	2.25
3000 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flat)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forcing quality. The differential for cold-drawn bars is 3c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 16 x 16 in. in. the price for a gross ton is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of 1 to 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars *

Bars, f.o.b. Pittsburgh mill	1.70c
Bars, f.o.b. Chicago	1.75c
Bars, Cleveland	1.75c
Bars, Detroit	1.75c
Bars, Buffalo	1.90c
Bars, eastern Michigan	1.95c
Shafting, ground, f.o.b. mill	1 1/4 in. 3.00c
	1-3/16 to 1 1/2 in. 2.50c
	1-9/16 to 1 3/4 in. 2.35c
	1-15/16 to 2 in. 2.20c
	2-1/16 to 6 in. 2.05c

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.55c
No. 10, f.o.b. Chicago mill	1.65c
No. 10, del'd Philadelphia	1.80c
No. 10, f.o.b. Birmingham	1.70c
No. 10, C.I.F. Pacific Coast ports	2.17 1/2c

Hot-rolled and Annealed

No. 10, Pittsburgh	1.70c
No. 10, Chicago mills	1.80c
No. 10, Birmingham	1.85c
No. 10, Pacific Coast ports	2.32 1/2c
No. 10, wrought iron, Pittsburgh	3.60c

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.10c to 2.20c
No. 24, f.o.b. Chicago mills	2.20c to 2.30c
No. 24, del'd Philadelphia	2.41c to 2.51c
No. 24, f.o.b. Birmingham	2.35c
No. 24, C.I.F. Pacific Coast ports	2.85c
No. 24, wrought iron, Pittsburgh	4.30c

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.60c
No. 10 gage, f.o.b. Chicago mills	2.70c
No. 10 gage, del'd Philadelphia	2.81c

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.50c
No. 20 gage, f.o.b. Chicago mills	2.60c
No. 20 gage, del'd Philadelphia	2.81c

Note: Automobile body stock and steel furniture sheets to be quoted hereafter on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c
No. 24, f.o.b. Chicago mills	2.95c
No. 24, del'd Philadelphia	3.16c
No. 24, f.o.b. Birmingham	3.60c
No. 24, C.I.F. Pacific Coast ports	3.50c
No. 24, wrought iron, Pittsburgh	4.85c

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	2.80c
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Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.50c to 2.60c
No. 20, f.o.b. Pittsburgh	3.00c to 3.10c

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.30c
No. 28, Chicago mill	2.40c to 2.50c

Tin Plate

Base per Box	
Standard cokes, f.o.b. P'gh district mill	\$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I.C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

Base per lb.	
All widths up to 24 in., Pittsburgh	1.45c
All widths up to 24 in., Chicago	1.55c
Cooperage stock, P'gh.	1.55c to 1.60c
Cooperage stock, Chicago	1.65c to 1.70c

Cold-Rolled Strips

P.o.b. Pittsburgh	2.60c
P.o.b. Cleveland	2.60c
P.o.b. Chicago	2.30c
P.o.b. Worcester	2.20c
Fender stock, No. 20, gage, Pittsburgh or Cleveland	2.70c to 2.75c

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
(After Dec. 31, extras of 10c a 100 lb. on mixed and joint carloads. 25c on pool carloads and 40c on L's than carloads will be applied on all merchant wire products.)

To Manufacturing Trade	
Bright wire	2.20c
Spring wire	3.20c

To Jobbing Trade	Base per Box
Standard wire nails	\$1.95
Smooth coated nails	1.95
Galvanized nails	3.95

Base per lb.	
Smooth annealed wire	2.15c
Smooth galvanized wire	2.80c
Polished staples	2.20c to 2.65c
Galvanized staples	2.75c to 2.90c
Barbed wire, galvanized	2.60c

Woven wire fence No. 9 gage, per net ton	\$55.00
Woven wire fence, No. 12 1/2 gage and lighter, per net ton	60.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel	Black Galv	Iron
Inches	Black Galv	Inches
1 1/2	51 1/2 28 1/2	1 1/2 28 1/2
2	57 34 1 1/2 29 1/2	2 28 10 1/2
3	62 40 1 1/2 30 1/2	3 28 16 1/2
4	65 1/2 45 1 1/2 31 1/2	4 28 22 1/2
5	67 1/2 47 1 1/2 32 1/2	5 28 28 1/2
6	69 1/2 49 1 1/2 33 1/2	6 28 34 1/2
8	73 1/2 53 1 1/2 37 1/2	8 28 40 1/2
10	77 1/2 57 1 1/2 41 1/2	10 28 46 1/2
12	81 1/2 61 1 1/2 45 1/2	12 28 52 1/2

Lap Weld	
2	61 50 1/2 26 12 1/2
2 1/2 to 6	61 1/2 54 2 1/2 to 3 1/2 32 18 1/2
7 and 8	62 51 4 to 6 35 22
9 and 10	60 49 7 and 8 34 21 1/2
11 and 12	59 48 9 to 12 31 16 1/2

Bolt Weld, extra strong, plain ends	
1 1/2	28 8 1/2 1 1/2 17 14 1/2
2	32 38 1 1/2 17 14 1/2
3	37 43 1 1/2 17 14 1/2
4	42 48 1 1/2 17 14 1/2
5	47 53 1 1/2 17 14 1/2
6	52 58 1 1/2 17 14 1/2
8	62 68 1 1/2 17 14 1/2
10	72 78 1 1/2 17 14 1/2
12	82 88 1 1/2 17 14 1/2

Lap Weld, extra strong, plain ends	
2	59 49 1/2 24 18 1/2
2 1/2 to 4	62 1/2 53 2 1/2 to 4 29 25
4 1/2 to 6	62 52 1/2 4 to 6 38 24
7 to 8	58 47 7 & 8 36 22
9 and 10	51 1/2 40 1/2 9 to 12 26 13 1/2
11 and 12	50 1/2 39 1/2 9 to 12 26 13 1/2

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is charged from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh	
Steel	Charcoal Iron
2 in. and 2 1/2 in.	1 1/2 in. 1
3 in. and 3 1/2 in.	1 1/2 in. 8
4 in. and 4 1/2 in.	2 in. 13
5 in. and 5 1/2 in.	2 1/2 in. 16
6 in. and 6 1/2 in.	3 in. 17
8 in. and 8 1/2 in.	3 1/2 in. 18
10 in. and 10 1/2 in.	4 in. 20
12 in. and 12 1/2 in.	4 1/2 in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on lot and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:
Lap-Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in. and 1 1/2 in.	3 in. 46
1 1/2 to 1 3/4 in.	3 1/2 to 3 3/4 in. 48
1 3/4 in. and 2 in.	4 in. 53
2 to 2 1/4 in.	4 1/2 in. 5 and 6
2 1/4 to 2 3/4 in.	5 in. 46

Hot Rolled	
2 and 2 1/2 in.	3 1/2 to 3 3/4 in. 54
2 1/2 and 2 3/4 in.	4 in. 57
3 in. and 3 1/2 in.	4 1/2 in. 5 and 6
3 1/2 in. and 4 in.	5 in. 46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb. base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard cases take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List	
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.45% base	50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

RAILS AND TRACK SUPPLIES

Rails

Per Gross Ton	
Standard, f.o.b. mill	\$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	26.00

Track Equipment

Base per 100 lb.	
Spikes, 9/16 in. and large	\$2.40
Spikes, 3/4 in. and large	2.40
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count	75 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(P.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List	
Machine bolts	75
Carriage bolts	75
Lag bolts	75
Pin bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagonal	75
C.p.e. and t. square or hex nuts, blank or tapped	75
Washers* 7.00c. to 6.75c. per lb. off list	

*F.o.b. Chicago, New York and Pittsburgh.

Bolts and Nuts

Per Cent Off List	
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Store bolts in packages, P'gh	75, 25 and 10
Store bolts in packages, Chicago	75, 25 and 10
Store bolts in pkgs., Cleveland	75, 25 and 10
Store bolts in bulk, P'gh	75, 25 and 10
Store bolts in bulk, Chicago	75, 25 and 10
Store bolts in bulk, Cleveland	75, 25 and 10
Tire bolts	60 and 10

Discount of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

Base per 100	
P.o.b. Pittsburgh or Cleveland	\$2.25
P.o.b. Chicago	2.35

Small Rivets

Per Cent Off List	
P.o.b. Pittsburgh	70, 10 and 5
P.o.b. Cleveland	70, 10 and 5
P.o.b. Chicago	70, 10 and 5

Cap and Set Screws

Discounts to Jobbers
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List	
Milled cap screws, 1 in. dia. and smaller	50 and 25
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and

Skelp	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.60c
Universal	1.60c
Sheared	1.60c

Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke	
	Per Net Ton
Furnace f.o.b. Connellsville	\$1.75 to \$2.00
Prompt	2.75 to 4.25
Foundry, f.o.b. Connellsville	7.00
Foundry, by-product, Chicago	7.75
Foundry, by-product, delivered in Chicago switching district	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Philadelphia, delivered	9.00
Foundry, by-product, Cleveland, delivered	7.82
Foundry, by-product, St. Louis, f.o.b. piers	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.00 to \$1.15
Mine run coking coal, f.o.b. W. Pa. mines	1.10 to 1.25
Gas coal, 1/2-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil	
	Per Gal. f.o.b. Bayonne, N. J.
No. 2 distillate	4.00c
No. 4 industrial	3.50c
	Per Gal. f.o.b. Baltimore
No. 2 distillate	4.00c
No. 4 industrial	3.50c
	Per Gal. del'd Chicago
No. 3 industrial fuel oil	2.80c to 2.90c
No. 5 industrial fuel oil	2.45c to 2.50c
	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.25c
No. 4 industrial	4.75c

REFRACTORIES

Fire Clay Brick	
	Per 1000 f.o.b. Works
Penn. High-heat	35.00 to 30.00
Maryland Intermediate	25.00 to 30.00
New Jer. Duty Brick	\$44.00 to 57.00
Ohio	35.00 to 30.00
Kentucky	35.00 to 30.00
Missouri	35.00 to 30.00
Illinois	35.00 to 30.00
Ground fire clay, per ton	6.50

Chrome Brick	
	Per Net Ton
Standard size	\$42.50

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$38.40 to \$41.40
4-in., del'd Chicago	41.40 to 44.40
6-in., and larger, del'd New York	33.30
4-in., del'd New York	36.30
6-in., and larger, Birm'ham	35.30
4-in., Birm'ham	38.30

Class "A" and gas pipe, \$3 extra.

VALLEY

Per Gross ton, f.o.b. Valley furnace:	
Basic	\$13.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to \$1.26.

CHICAGO

Per gross ton at Chicago furnace:	
N'th'n No. 2 fdy.	\$15.50
N'th'n No. 1 fdy.	16.00
Malleable, not over 2.25 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
No. 2 soft, sil. 1 to 2, Copper free	25.00
Silvery, sil. 8 per cent.	23.67
Bess., ferro-sil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:	
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd	\$18.30 to 18.80
Southern No. 2 fdy., del'd	14.56
Northern malleable, del'd	18.30 to 18.80
Northern basic, del'd	18.30 to 18.80

Freight rates \$3c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$1.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:	
* Buffalo, No. 2, del'd east	
N. J.	\$17.41 to \$17.66
East Pa. No. 2 fdy.	14.02
East Pa. No. 2 fdy.	14.52

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania. * Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:	
No. 2 fdy.	\$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

Per gross ton delivered to most New England points:

* Buffalo, sil. 1.75 to 2.25	\$19.05
* Buffalo, sil. 2.25 to 2.75	19.05
* Buffalo, sil. 1.75 to 2.25	17.41
* Buffalo, sil. 2.25 to 2.75	17.41
* Ala., sil. 1.75 to 2.25	15.64
* Ala., sil. 2.25 to 2.75	16.14

Freight rates: \$5.05 all rail from Buffalo, and \$3.41 to \$3.91 rail and water from Buffalo when \$1 barge and \$2 to \$2.50 New England freight rate are obtainable; \$5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.

† Rail-and-water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:	
Ala. fdy., sil. 1.75 to 2.25	\$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	\$17.01 to 17.50
S'th'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:	
N'th'n No. 2 fdy. (local delivery)	\$15.00
S'th'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent.	21.87
Stand. low phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:	
East. Pa. No. 2	\$13.34 to \$13.81
East. Pa. No. 2X	13.84 to 14.34
East. Pa. No. 1X	14.34 to 14.84
Basic (del'd east. Pa.)	13.50 to 14.00
Malleable	14.74 to 18.04
Stand. low phos. (f.o.b. east. Pa. furnace)	20.00 to 21.00
Cop. b't'g low phos. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:	
No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 soft, sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

Ferromanganese

Per Gross Ton	
Domestic, 80%, seaboard	\$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$24.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (less carloads)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b.) Welland, Ont., in carloads	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10%	\$20.50
11%	21.00
12%	21.50
13%	22.00
14%	23.50
15%	24.00
16%	25.00
17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6%	\$18.00
7%	18.50
8%	18.75
9%	19.00
10%	19.50
11%	20.00
12%	20.50
13%	21.00
14%	22.50
15%	23.50
16%	24.00
17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wa. del., carloads	\$94c.
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Ferrotungsten, less carloads	\$1.00
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	1.00c
Ferrocromium, 2% carbon	17.00c. to 17.50c.
Ferrocromium, 1% carbon	19.00c. to 20.00c.
Ferrocromium, 0.10% carbon	20.00c.
Ferrocromium, 0.06% carbon	25.00c. to 27.00c.
Ferrovandium, del., per lb. contained Va.	\$3.05 to \$3.30
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace in carloads	70.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18% Rockdale, Tenn., base per gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	55.00
Ferromolybdenum, per lb. Mo., del.	90c.
Calcium molybdate, per lb. Mo., del.	50c.
Silico spiegel, per ton, f.o.b. furnace car lots	\$100.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	85.00
1% carbon grade	105.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.50
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.63
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.49
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit

Iron, low phos., copper free, 53 to 58% iron, dry	Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68 1/2% iron		9c.
Iron, basic or foundry, Swedish, average 65% iron		8c.
Iron, basic or foundry, Russian, average 65% iron (nom.)		9c.
Manganese, Caucasian, washed 52%		*23c.
Manganese, African, Indian, 50-52%		*21c. to 22c.
Manganese, Brazilian, 46 to 48%		*13c.
Tungsten, Chinese wolframite, duty paid		\$10.00
Tungsten, domestic scheelite		\$8.00 to \$10.40
Chrome, 45%, Cr2O3, crude, c.i.f. Atlantic seaboard		16.00
Chrome, 45%, Cr2O3, c.i.f. Atlantic seaboard		18.00
* Quotations nominal in absence of sales.		

Fluorspar

Per Net Ton	
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	\$9.00 to \$10.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	12.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	\$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 95% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$8.50 to \$9.00
No. 2 heavy melting steel	7.00 to 7.50
No. 2 railroad wrought	8.50 to 9.00
Scrap rails	8.50 to 9.00
Rails 3 ft. and under	10.00 to 11.00
Sheet bar crops, ordinary	9.00 to 9.50
Compressed sheet steel	8.25 to 8.75
Hand bundled sheet steel	7.00 to 7.50
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	9.00 to 10.00
Railr. knuckles and couplers	9.50 to 10.00
Rail coil and leaf springs	9.50 to 10.00
Boiled steel wheels	9.50 to 10.00
Low phos. billet crops	11.00 to 11.50
Low phos. sheet bar crops	11.00 to 11.50
Low phos. plate scrap	10.00 to 10.50
Low phos. punchings	10.50 to 11.00
Steel car axles	11.00 to 11.50

CHICAGO

Delivered Chicago district consumers:	
	Per Gross Ton
Heavy melting steel	\$5.00 to \$5.50
Shoveling steel	5.00 to 5.50

Frogs, switches and guards	\$5.00 to \$5.50
Hydraulic comp. sheets	3.75 to 4.25
Drop forge flashings	4.00 to 4.50
No. 1 busheling	3.50 to 4.00
Boiled carwheels	7.00 to 7.50
Railroad tires	8.00 to 8.50
Railroad leaf springs	8.00 to 8.50
Steel turnings	4.50 to 5.00
Steel couplers and knuckles	7.00 to 7.50
Coil springs	8.50 to 9.00
Coil turnings (elec. fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	8.00 to 8.50
Cast iron borings	3.00 to 3.50
Short shoveling turnings	3.00 to 3.50
Machine shop turnings	3.00 to 3.50
Revolving rails	7.50 to 8.00
Steel rails, less than 3 ft.	8.25 to 8.75
Steel rails, less than 2 ft.	8.75 to 9.25
Angle bars, steel	7.00 to 7.50
Cast iron carwheels	7.00 to 7.50
Railroad malleable	7.50 to 8.00
Agricultural malleable	5.00 to 5.50
* Relaying rails, 56 to 60 lb.	15.00 to 17.00
* Relay rails, 65 lb. and up	18.00 to 23.00

No. 1 busheling.....	\$2.00 to \$2.50
Low active tires, smooth.....	1.50 to 2.50
Pl. and fues.....	1.25 to 1.75
No. 1 machinery cast.....	6.25 to 6.75
Automobile cast.....	6.25 to 6.75
No. 1 railroad cast.....	6.25 to 6.75
No. 1 agricultural cast.....	5.25 to 5.75
Stove plate.....	5.75 to 6.25
Gray bars.....	5.00 to 5.50
Brass shoes.....	5.75 to 6.25
Playing rails, including angle bars.....	to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.....	\$6.50 to \$7.00
No. 2 heavy melting steel.....	5.00 to 5.50
Hot-rolled sheet.....	7.50 to 8.00
Hydraulic compressed, new.....	4.00 to 4.50
Hydraulic compressed, old.....	5.50 to 6.00
Machine shop turnings.....	4.00 to 4.50
Heavy axle turnings.....	3.50 to 4.00
Cast borings.....	5.50 to 6.00
Cast iron breakable cast.....	3.50 to 4.00
Stove plate (steel works).....	6.00 to 6.50
Cast iron breakable cast.....	10.00 to 10.50
Cast iron breakable cast.....	8.00 to 8.50
No. 1 blast furnace.....	3.50 to 4.00
Cast iron and steel pipe.....	6.50 to 7.00
Shafting.....	12.00 to 13.00
Steel axles.....	12.00 to 13.00
No. 1 forge fire.....	5.50 to 6.00
Cast iron car wheels.....	8.50 to 9.00
No. 1 cast.....	8.00 to 8.50
Cast borings (chem.).....	8.00 to 10.00
Steel rails for rolling.....	9.00 to 9.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.....	\$7.00 to \$7.25
No. 2 heavy melting steel.....	6.25 to 6.50
Compressed sheet steel.....	6.00 to 6.50
Light bundled sheet stamp.....	4.00 to 4.50
Drop forge flashings.....	5.25 to 5.75
Machine shop turnings.....	3.25 to 3.50
Short shoveling turnings.....	4.00 to 4.50
No. 1 busheling.....	5.00 to 5.50
Steel axle turnings.....	5.00 to 5.50
Low phos. billet crops.....	10.00 to 11.00
Cast iron borings.....	3.75 to 4.00
Mixed borings and short turnings.....	3.75 to 4.00
No. 2 busheling.....	3.75 to 4.00
No. 1 cast.....	7.50 to 8.00
Railroad grate bars.....	5.00 to 5.50
Store plate.....	5.00 to 5.50
Rails under 3 ft.....	8.50 to 9.00
Rails for rolling.....	8.50 to 9.00
Railroad malleable.....	8.75 to 9.00
Cast iron car wheels.....	8.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel.....	\$6.00 to \$6.50
No. 2 heavy melting steel.....	5.50 to 6.00
Scrap rails.....	6.75 to 7.25
New hydraulic comp. sheets.....	5.50 to 6.00
Old hydraulic comp. sheets.....	4.50 to 5.00
Drop forge flashings.....	5.50 to 6.00
No. 1 busheling.....	5.50 to 6.00
Hyv. steel axle turnings.....	6.00
Machine shop turnings.....	4.00 to 4.50
Knuckles and couplers.....	10.00
Coil and leaf springs.....	10.00
Roller steel wheels.....	10.00
Low phos. billet crops.....	9.00 to 9.50
Short shov. steel turnings.....	5.50 to 6.00
Short mixed borings and turnings.....	3.75 to 4.25
Cast iron borings.....	3.75 to 4.25
No. 2 busheling.....	3.50 to 4.00
Steel car axles.....	10.00 to 11.00
Iron axles.....	10.00 to 11.00
No. 1 machinery cast.....	9.50 to 10.00
No. 1 cupola cast.....	8.50 to 9.00
Stove plate.....	8.50 to 9.00
Steel rails, 3 ft.....	9.25 to 9.75
Cast iron car wheels.....	8.00 to 8.50
Industrial malleable.....	7.00 to 7.50
Railroad malleable.....	7.00 to 7.50
Chemical borings.....	7.50 to 8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel.....	\$7.50 to \$8.00
Scrap steel rails.....	8.00 to 8.50
Short shoveling turnings.....	4.00
Stove plate.....	6.00
Steel axles.....	9.00
Iron axles.....	9.00
No. 1 railroad wrought.....	4.50 to 5.00
Rails for rolling.....	8.00 to 8.50
No. 1 cast.....	8.50
Tramcar wheels.....	8.50
Cast iron borings, cham.....	8.50
Per gross ton delivered consumers' yards:	
Selected heavy steel.....	\$5.50 to \$6.00
No. 1 heavy melting.....	5.00 to 5.50
No. 2 heavy melting.....	5.00 to 5.50
No. 1 locomotive tires.....	5.00 to 5.50
Misc. stand-sec. rails.....	5.25 to 5.75
Railroad springs.....	6.25 to 6.75
No. 2 railroad wrought.....	2.00 to 2.50
No. 1 busheling.....	5.00 to 5.50
Cast iron borings.....	3.50 to 4.00
Shoveling turnings.....	2.75 to 3.25
Rails for rolling.....	7.00 to 7.50
Machine shop turnings.....	2.00 to 2.50
Heavy turnings.....	3.00 to 3.50
Steel car axles.....	8.50 to 9.00
Iron car axles.....	11.00 to 11.50
Cast iron bars and trans.....	4.00 to 4.50
No. 1 railroad wrought.....	8.50 to 9.00
Steel rails less than 3 ft.....	7.00 to 7.50
Steel angle bars.....	6.00 to 6.50

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel.....	\$5.50 to \$6.00
No. 1 heavy melting.....	5.00 to 5.50
No. 2 heavy melting.....	5.00 to 5.50
No. 1 locomotive tires.....	5.00 to 5.50
Misc. stand-sec. rails.....	5.25 to 5.75
Railroad springs.....	6.25 to 6.75
No. 2 railroad wrought.....	2.00 to 2.50
No. 1 busheling.....	5.00 to 5.50
Cast iron borings.....	3.50 to 4.00
Shoveling turnings.....	2.75 to 3.25
Rails for rolling.....	7.00 to 7.50
Machine shop turnings.....	2.00 to 2.50
Heavy turnings.....	3.00 to 3.50
Steel car axles.....	8.50 to 9.00
Iron car axles.....	11.00 to 11.50
Cast iron bars and trans.....	4.00 to 4.50
No. 1 railroad wrought.....	8.50 to 9.00
Steel rails less than 3 ft.....	7.00 to 7.50
Steel angle bars.....	6.00 to 6.50

Cast iron car wheels.....	5.00 to 5.50
No. 1 machinery cast.....	6.50 to 7.00
Railroad malleable.....	4.00 to 4.50
No. 1 railroad cast.....	6.25 to 6.75
Stove plate.....	6.25 to 6.75
Relay rails, 60 lb. and under.....	6.00 to 6.50
Relay rails, 60 lb. and over.....	16.00 to 16.50
Agricult. malleable.....	20.00 to 21.00
Agricult. malleable.....	4.00 to 4.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.....	\$3.50 to \$4.50
No. 2 heavy melting steel.....	3.00
Heavy melting steel (trans).....	1.50
No. 1 hvy. breakable cast.....	5.00 to 5.25
Stove plate (steel works).....	2.50 to 2.75
Machine shop turnings.....	0.75 to 1.25
Short shoveling turnings.....	0.75 to 1.25
Cast borings.....	0.50 to 1.00
No. 1 blast furnace.....	0.50 to 1.00
Steel car axles.....	8.00 to 8.50
Spec. iron and steel pipe.....	2.75 to 3.00
Forge fire.....	2.75 to 3.00
No. 1 railroad wrought.....	4.00 to 4.50
Rails for rolling, long.....	3.25 to 3.50
No. 1 cast.....	5.00 to 5.50
No. 2 cast.....	5.00 to 5.50
Stove plate (foundry).....	4.50 to 5.00
Malleable cast (railroad).....	4.50 to 4.50
Cast borings (chemical).....	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast.....	\$2.00
No. 1 hvy. cast (cupola size).....	7.50 to 8.00
No. 2 cast.....	4.00 to 4.50

PITTSBURGH

Base per lb.	
Plates.....	2.85c
Structural shapes.....	2.85c
Soft steel bars and small shapes.....	2.60c
Reinforcing steel bars.....	2.60c
Cold-finished and screw stock.....	2.95c
Rounds and hexagons.....	3.45c
Squares and flats.....	2.95c
Hoops and bands, under 1/4 in.....	2.95c
Hot-rolled annealed sheets (No. 24).....	3.15c
Galv. sheets (No. 24), 25 or more bundles.....	3.65c
Galv. corrug. sheets (No. 10).....	3.10c
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.).....	\$3.74
Spikes, large.....	2.40c
Small.....	2.85c to 2.90c
Beats.....	2.90c
Track bolts, all sizes, per 100 count.....	70 per cent off list
Machine bolts, 100 count.....	70 per cent off list
Carriage bolts, 100 count.....	70 per cent off list
Nuts, all styles, 100 count.....	70 per cent off list
Large rivets, base per 100 lb.....	\$3.00
Wire, black, soft, ann'd, base per 100 lb.....	2.75
Wire, galv. soft, base per 100 lb.....	3.20
Common wire nails, per keg.....	5.50
Cement coated nails, per keg.....	2.35

CHICAGO

Base per lb.	
Plates and structural shapes.....	3.00c
Soft steel bars.....	2.75c
Reinforce. bars, billet steel.....	2.75c
Hot-rolled sheet reinforcement.....	1.15c to 1.40c
Rail steel reinforcement.....	1.15c to 1.25c
Cold-fn. steel bars and shafting.....	3.00c
Rounds and hexagons.....	3.50c
Plats and squares.....	3.50c
Bands, 1/4 in. (in Nos. 10 and 12 gages).....	2.95c
Hoops (No. 14 gage and lighter).....	3.50c
Hot-rolled annealed sheets (No. 24).....	3.45c
Galv. sheets (No. 24).....	3.75c
Hot-rolled sheets (No. 24).....	2.75c
Spikes (1/4 in. and lighter).....	3.45c
Trunk bolts.....	4.30c
Rivets, structural.....	3.75c
Rivets, boiler.....	3.75c
Machine bolts.....	70
Carriage bolts.....	70
Cup and lag screws.....	70
Hot-pressed nuts, sq. tap or blank.....	70
Hot-pressed nuts, hex. tap or blank.....	70
Hex. head cap screws.....	80 and 10
Cup point set screws.....	75 and 10
Flat head bright wood screws.....	52 1/2 and 10
Spring cotter pins.....	80
Stove bolts.....	80
Rd. hd. tank rivets, 7/16 in. and smaller.....	65
Wrought washers.....	\$4.50 off list
No. 8 black ann'd wire, per 100 lb.....	\$3.45
Com. wire nails, base per keg.....	2.30
Cement c'd nails, base per keg.....	2.30

NEW YORK

Base per lb.	
Plates and struc. shapes.....	3.10c
Soft steel bars, small shapes.....	3.10c
Iron bars.....	3.24c
Iron bars, Swed. charcoal.....	6.00c to 6.50c
Cold-fn. shafting and screw stock.....	3.30c
Rounds and hexagons.....	3.30c
Plats and squares.....	3.60c
Cold-roll. strip, soft and quarter hard.....	4.95c
Hoops.....	3.30c
Bands.....	3.30c
Hot-rolled sheets (No. 10).....	3.00c
Hot-rolled ann'd sheets (No. 24).....	3.50c
Galvanized sheets (No. 24).....	4.00c
Standard tool steel.....	4.50c
Wire, black annealed (No. 10).....	12.00c
Wire, galv. annealed (No. 10).....	4.50c
Wire steel, 1/4 x 1/4 in. and larger.....	2.40c
Sheet p. finish, 1 to 2 1/4 x 1/4 in. and larger.....	2.75c

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.....	\$3.00 to \$3.25
Scrap T. rails.....	2.50 to 2.75
Machine shop turnings.....	0.80 to 1.00
Cast iron borings.....	1.05
Bundled skeleton.....	2.00 to 2.10
Forge flashings.....	3.00 to 3.50
Blast furnace scrap.....	0.90 to 1.00
Forge scrap.....	3.00 to 3.25
Shafting.....	9.50 to 10.00
Steel car axles.....	9.00 to 9.50
Wrought pipe.....	4.00 to 4.25
Rails for rolling.....	4.50 to 5.00
Cast iron borings, chemical.....	7.00 to 7.25
Per gross ton delivered consumers' yards:	
No. 1 machinery cast.....	\$7.00 to \$7.50
No. 1 cast.....	7.50 to 8.00
Stove plate.....	8.00 to 8.25
Railroad malleable.....	8.00 to 8.50

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy Melting steel.....	\$5.50 to \$6.00
Scrap rails for melting.....	6.00 to 6.50
Loose sheet clippings.....	1.50 to 2.00
Bundled sheets.....	3.75 to 4.25
Cast iron borings.....	3.25 to 3.75
No. 1 busheling.....	3.00 to 3.50
No. 2 busheling.....	4.50 to 5.00
Rails for rolling.....	2.75 to 3.25
No. 1 locomotive tires.....	6.50 to 7.00
Short rails.....	7.50 to 8.00
Cast iron car wheels.....	9.00 to 9.50
No. 1 machinery cast.....	6.50 to 7.00
No. 1 railroad cast.....	8.25 to 8.75
No. 1 railroad cast.....	7.75 to 8.25

Burns cast.....	4.25 to 4.75
Stove plate.....	4.25 to 4.75
Agricultural malleable.....	7.75 to 8.25
Railroad malleable.....	8.25 to 8.75

DETROIT

Dealers' buying prices per gross ton:	
Hvy. melting steel.....	\$4.50 to \$5.00
Borings and short turnings.....	2.00 to 2.50
Long turnings.....	1.50 to 2.00
No. 1 machinery cast.....	7.75 to 8.25
Automotive cast.....	8.00 to 8.50
Hydraul. comp. sheets.....	4.00 to 4.50
Stove plate.....	3.00 to 3.50
No. 1 busheling.....	3.50 to 4.00
Old No. 2 busheling.....	1.50 to 2.00
Sheet clippings.....	1.25 to 1.75
Flashings.....	2.75 to 3.25

CANADA

Dealers' buying prices per gross ton:	
Heavy melting steel.....	\$7.00 Montreal
Rails, scrap.....	7.00
No. 1 wrought.....	6.00
Machine shop turnings.....	2.00
Boiler plate.....	5.00
Heavy axle turnings.....	2.50
Cast borings.....	2.00
Steel borings.....	2.00
Wrought pipe.....	2.00
Steel axles.....	7.00
Axles, wrought iron.....	7.00
No. 1 machinery cast.....	12.50
Stove plate.....	10.00
Standard car wheels.....	10.00
Malleable.....	10.00

Warehouse Prices for Steel Products

Open-hearth spring steel, base.....	4.50c to 7.00c
Common wire nails, base, per keg.....	\$2.60
Machine bolts, cut thread:	Off List
1/2 x 2 in. and smaller.....	65 to 65 and 10
1 x 30 in. and smaller.....	65 to 65 and 10
Carriage bolts, cut thread:	Off List
1/2 x 6 in. and smaller.....	65 to 65 and 10
1/2 x 20 in. and smaller.....	65 to 65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.....	\$18.05
Seamless welded, 2-in.....	19.24
Charcoal iron, 2-in.....	24.94
Charcoal iron, 4-in.....	63.65
*No. 28 and lighter, 36 in. wide, 20c higher per 100 lb.	

ST. LOUIS

Base per lb.	
Plates and struc. shapes.....	3.25c
Bars, soft steel or iron.....	3.00c
Cold-fn. rounds, shafting, screw stock.....	3.30c
Hot-rolled annealed sheets (No. 24).....	3.80c
Rebates (No. 24).....	4.35c
Hot-rolled sheets (No. 10).....	3.45c
Black corrug. sheets (No. 24).....	3.85c
Galv. corrug. sheets.....	4.40c
Structural rivets.....	4.00c
Boiler rivets.....	4.00c
Tank rivets, 1/2 in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	70
Carriage bolts.....	70
Lag screws.....	70
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more.....	70
Less than 200 lb.....	60
Hot-pressed nuts, hex. blank or tapped, 200 lb. or more.....	70
Less than 200 lb.....	60

PHILADELPHIA

Base per lb.	
*Plates, 1/4-in. and heavier.....	2.10c
*Structural shapes.....	2.10c
*Soft steel bars, small shapes, iron bars (except bands).....	2.10c
Reinforce. steel bars, sq. twisted and deformed.....	2.30c
Cold-fn. steel, rounds and hex.....	3.35c
Cold-fn. steel, sq. and flats.....	3.85c
*Steel hoops, No. 12 to 3/16 in. incl.....	2.65c
Spring steel.....	2.40c
Hot-rolled annealed sheets (No. 24).....	3.55c
Galvanized sheets (No. 24).....	3.75c
*Hot-rolled and annealed sheets (No. 10).....	2.55c
Diam. pat. floor plates, 1/4 in.....	5.00c
Swedish iron bars.....	5.60c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices for 15,000-lb. orders; extra apply for smaller quantities.

CLEVELAND

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Intercontinental Pipe & Mining Co., 122 East Forty-second Street, New York, manufacturer of cast iron pipe, fittings, etc., is planning expansion and plant modernization at New Castle, Del., formerly works of Penn-Seaboard Steel Corp., acquired several months ago.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Dec. 20 for 7500 ft. cable and three reels (Circular 34), voltmeters, armatures, ball bearings, couplings, coils, springs, valves, grease cups, capacitors, valve assemblies, etc. (Circular 31); until Jan. 3, 11,000 knives (Circular 36), 170 manhole tops (Circular 35).

John W. Sullivan Co., 827 East Ninth Street, New York, manufacturer of marine engines, parts, etc., let general contract to Albert A. Lutz Co., 285 Madison Avenue, for improvements and modernization in machine shop, 68 x 135 ft., replacing recent fire loss. Cost over \$25,000. Harry R. Harvie, 370 Seventh Avenue, New York, is architect.

Excelsior Novelty Casting Co., Inc., Bronx, New York, has been organized by Sol Collins, 1826 White Plains Avenue and Fred Field, 1979 Daly Avenue, both Bronx, to manufacture metal novelties and specialties.

New York, New Haven & Hartford Railroad Co., Grand Central Terminal, New York, let general contract to Austin Co., 120 Broadway, for one-story storage and distributing building, 52 x 214 ft., in Bronx. Cost about \$40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one motor-driven precision type bench lathe (Schedule 9220) 63,000 lb., welding electrodes (Schedule 9216), 600 oxygen tank closing valves (Schedule 9194), one electric arc welding set and spare parts (Schedule 9256), until Jan. 4, one refrigerating equipment and spare parts (Schedule 9237), all for New York Navy Yard.

Albee Metal Products, Inc., Brooklyn, has been organized by Benjamin Cooperman, 1316 Forty-fifth Street, and associates, to manufacture radiator enclosures, iron grilles and kindred metal products.

Board of Water Supply, 346 Broadway, New York, is considering installation of steel frame corrugated steel covering at Hillview Reservoir, also crane equipment, etc. Cost about \$26,000.

Piel Brothers, Georgia Avenue, Brooklyn, are considering expansion and improvements at brewing plant, including additional equipment. Cost about \$1,000,000 with machinery. William F. J. Piel is manager.

George J. Atwell Foundation Corp., 136 East Fifty-seventh Street, New York, building foundations and equipment, has purchased factory at Long Island City, on site 100 x 100 ft., and will remodel for new plant.

E-Z Cutting Device Corp., New York, has been organized by Isadore Banberger, 2101 Harrison Avenue, Bronx, and associates, to manufacture cutting machinery and appliances.

Cu'bert Pipe & Fittings Co., 170 Eighth Street, Jersey City, N. J., has taken title to four factory units on tract 210 x 203 ft., at West Side Avenue and Fisk Street, for expansion. Company has recently abandoned plans for erection of new plant on Tonnele Avenue.

Elton Mfg. Co., 2-16 Avenue C, Newark, manufacturer of hardware products, has resumed operations following curtailment for past two years, and will reinstate full working force on 8-hr. day, five-day week basis.

A. G. Schoonmaker & Sons, Inc., 59 Yale Avenue and 42 Hudson Street, Jersey City, N. J., industrial and power equipment for contractors, etc., property will be offered for sale by receivers on Dec. 19 and 20, at respective locations, including machine tools, Diesel engines, hoisting engines, concrete mixers, welding equipment, tanks, etc.

Lincoln Metal Products Corp., Newark, care of Harry Kaiser, 1172 Raymond Boulevard, representative, has been organized by S. L. Kesselman and associates to manufacture metal goods.

Republic Radio Tube Co., Inc., 76 Coit Street, Irvington, N. J., manufacturer of radio tubes, electric receivers and kindred radio

equipment, is running at capacity, 6-day-week basis, with employment of about 100 persons.

Superintendent of Lighthouses, Staten Island, N. Y., asks bids until Dec. 20 for 237 third class special can buoys and 160 third class special nun buoys (Proposal 42004).

Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, is arranging fund of about \$10,500,000 for extensions and improvements in power plants, power substations, transmission and distributing lines, etc. Of this amount, approximately \$2,000,000 will be used for addition to Richmond generating station, work on which has been started.

Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until Dec. 19 for five paint sprayer tanks for standard portable sprayers (Req. 800 Aero), 125 lubricating guns (Req. 832 Aero), 21,000 castellated nuts and 21,000 plain nuts (Req. 824 Aero).

Hershey Electric Co., Hershey, Pa., has applied for permission to acquire Dale and Manapada Electric companies, operating in West and South Hanover Townships, Dauphin County, and will consolidate, carrying out expansion in line construction.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one vertical turret lathe (Schedule 9217), two boring, drilling and milling machines (Schedule 9225), and one turret lathe (Schedule 9244), all motor-driven, for Philadelphia Navy Yard.

Department of Public Works, City Hall Annex, Philadelphia, asks bids until Dec. 27 for fabricated structural steel smoke plates for bridge service.

Town Council, Newark, Del., is considering installation of a municipal electric light and power plant, using Diesel engine units.

Iscro Chemical Co., Forty-seventh Street and Royal Avenue, Niagara Falls, N. Y., manufacturer of industrial chemicals, plans one-story addition, including new power house. Cost over \$45,000 with equipment.

Fisher Body Corp., East Delavan Avenue, Buffalo, manufacturer of automobile bodies, with headquarters at Detroit, plans early resumption of operations, recalling several hundred men.

◀ SOUTH ATLANTIC ▶

Board of District Commissioners, Washington, has rejected bids for new school unit at Industrial Home for Colored Children, Blue Plains, and contemplates call for new bids soon. Albert L. Harris, District Building, is municipal architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for equipment for blow-off system at power plant, local navy yard, including heat exchangers, control equipment, pipe, valves, fittings and auxiliary equipment (Specification 7139); bids (no closing date stated) for condensers and auxiliary equipment at Boston, Mass., and Puget Sound, Wash., navy yards (Specification 7114); until Dec. 28, one 150,000-gal. steel tank and tower, pumping machinery, gasoline engine alternator, cast iron piping and accessories (Specification 6702) for naval station, Corry Field, Pensacola, Fla.

Department of Public Works, Bureau of Water Supply, Municipal Office Building, Baltimore, asks bids until Dec. 1 for quantity of water meters.

Auto Parts & Supply Co., Greensboro, N. C., has been organized by Benjamin L. Herman, 116 North Main Street, High Point, N. C., and Emanuel Kaplan, Greensboro, to manufacture automobile parts and equipment.

Norfolk & Western Railway Co., N. & W. Railway Building, Roanoke, Va., Clyde Cocke, purchasing agent, asks bids until Dec. 21 for quantity of locomotive steel tires (Serial AA-627), and 2500 tons steel plates, shapes, bars, etc. (Serial AA-628).

Quartermaster, Marine Corps, Washington, asks bids until Dec. 19 for one 10-kw. motor-generator set (Schedule 236).

Tampa Shipbuilding & Engineering Corp., Tampa, Fla., plans construction of new dry dock, with machine and repair shop facilities.

United States Engineer Office, Washington, asks bids until Jan. 18 for four motor-driven

pumping units for booster pumping station, Washington Aqueduct.

North Pole Ice Co., Huntington, W. Va., has acquired two-story building, and will remodel for new electric-operated ice-manufacturing plant. Cost about \$60,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for steel boiler tubes (Schedule 9213), electric soldering irons (Schedule 9226) for Eastern and Western yards; 200,000 lb. admiralty metal condenser tubes (Schedule 9214) for Boston, Norfolk, Mare Island and Puget Sound navy yards; 1380 steam and water valves (Schedule 9253) for Boston, Brooklyn and other navy yards; 24 electric signaling searchlights and spare parts (Schedule 9199) for Brooklyn and Mare Island navy yards; until Jan. 4, 24 electric ventilating fans and spare parts (Schedule 9231) for Brooklyn, Boston, Philadelphia and Puget Sound navy yards; 247 couplings (Schedule 9252) for Norfolk, Sewall's Point and Mare Island navy yards.

Belcher Oil Co., 1217 Biscayne Boulevard, Miami, Fla., is considering new bulk oil storage and distributing plant at Port Everglades, Fla., with initial capacity of about 80,000 bbls., primarily for fuel oil service. Cost over \$40,000 with equipment.

◀ CENTRAL DISTRICT ▶

Rust Engineering Co., Koppers Building, Pittsburgh, has submitted low bid at \$1,489,900 for erection of new steam powerplant at Washington, for central heating service for Government buildings. United Engineers & Constructors, Inc., 112 North Broad Street, Philadelphia, is engineer.

Fort Pitt Brewing Co., Sixteenth Street, Pittsburgh, has arranged financing for \$75,000, to be increased later to about three times that amount, proceeds to be used for extensions and plant modernization at Sharpsburg, Pa.

H. C. Frick Coke Co., Pittsburgh, has resumed operations at No. 1 Continental plant at Uniontown, Pa., recalling about 100 men.

Department of Public Service, City Hall, Cleveland, is planning new municipal incinerator plant on 21-acre tract with powerhouse. Cost about \$700,000 with equipment. City architect and engineer will be in charge. William J. Kennedy is service director.

Machinery Forging Co., Hamilton Avenue, Cleveland, has been organized by Peter Herkner, who has taken over property of a company of same name which went into receivership some time ago. Force shop will be under management of J. B. Badger.

A. P. Schraner, 3338 Payne Street, Cleveland, manufacturer of tools, patterns, etc., has developed capacity production, with night shift in tool division.

Cleveland Equipment Works, General Electric Co., 1175 East 152nd Street, manufacturer of electric lamps, etc., let general contract to A. M. Higley Co., 2036 East Twenty-second Street, for one-story addition, 130 x 149 ft., for storage, distributing and other operating service.

Lincoln Can Co., Cleveland, care of Jerome M. Friedlander, 801 Citizens Building, representative, has been organized by Mr. Friedlander and S. C. Kessler, to manufacture tin cans and other metal containers.

Cleveland-Sandusky Brewing Co., 2600 Carroll Avenue, Cleveland, O. J. Fishel, vice-president, has plans for two additions, with installation of additional machinery. Cost \$260,000, of which about \$167,000 will be used for equipment. E. A. Broberg, 2014 West Fifty-third Street, is architect.

General Electric Co., Youngstown, Ohio, has removed lamp manufacturing plant from Buffalo to Youngstown, where large part of small Mazda lamp production will be concentrated. Automobile headlight lamps will also be manufactured here. Company has recently added about 150 persons to working force.

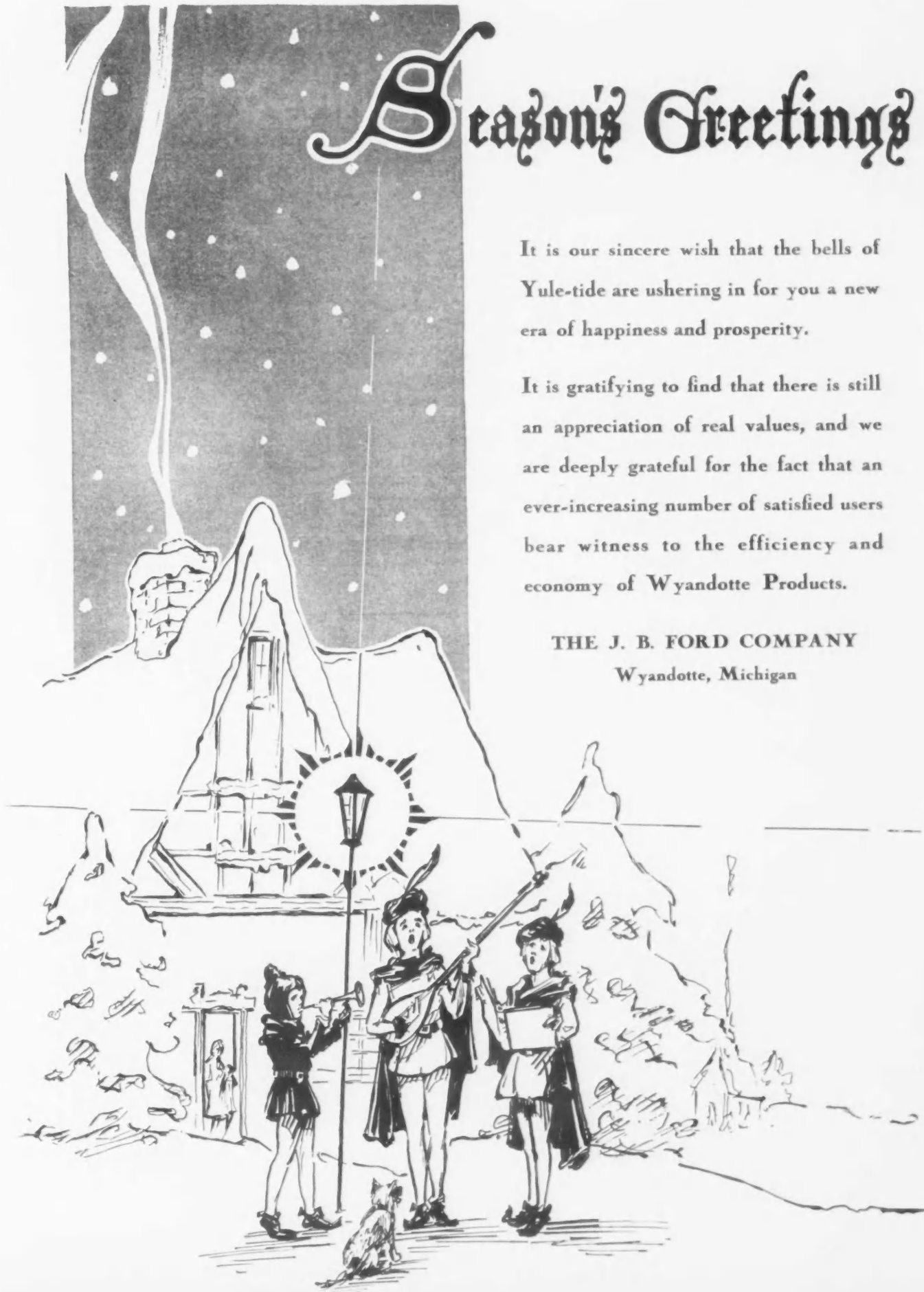
Board of Public Utilities Commissioners, City Hall, Cincinnati, Julian A. Pollak, chairman, has plans for a municipal electric generating plant, to be operated in conjunction with present steam stations, for light and power for city-owned buildings. Cost over

Season's Greetings

It is our sincere wish that the bells of Yule-tide are ushering in for you a new era of happiness and prosperity.

It is gratifying to find that there is still an appreciation of real values, and we are deeply grateful for the fact that an ever-increasing number of satisfied users bear witness to the efficiency and economy of Wyandotte Products.

THE J. B. FORD COMPANY
Wyandotte, Michigan



\$350,000. Fosdick & Hilmer, Union Trust Building, are consulting engineers.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Dec. 20 for 11,370 lb. structural steel (Proposal 271); until Dec. 21, one motor-driven engine lathe (Proposal 272); until Dec. 27, 15 starter crankshaft extension support assemblies and 15 exhaust collector ring assemblies (Proposal 283); 600 aircraft storage batteries (Proposal 280); two wire feed screw machines with motors (Proposal 279); until Dec. 28, 500 altimeter assemblies (Proposal 266); until Dec. 29, three aircraft fuel pump hydraulic drives (Proposal 271); until Jan. 3, 136 parachute flare external rack assemblies (Proposal 273).

Goodyear Tire & Rubber Co., Akron, Ohio, is running on higher production schedule, with employment of about 16,000 persons at local mill.

Great States Co., Inc., Richmond, Ind., manufacturer of power and hand-operated lawn mowers, parts, etc., has begun operations in new branch plant at Shelbyville, Ind., removing certain equipment from Richmond works.

Freeman Guest Machine Co., Inc., Huntington, Ind., has been organized by Freeman Guest and Russell H. Newell, Huntington, to manufacture machinery and parts, and operate general machine works.

Board of Works, City Hall, Fort Wayne, Ind., asks bids until Jan. 5 for equipment for municipal electric light and power plant. S. S. Snider is secretary. Froelich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

Kold-Hold Mfg. Co., Lansing, Mich., recently organized by Ranson E. Olds, Lansing, and associates, plans operation of factory for manufacture of electric refrigerating machinery, including equipment for refrigeration storage, air-conditioning equipment, etc. Mr. Olds will be chairman of board; Charles E. Ecker is president and treasurer.

City Council, Wyandotte, Mich., has plans for a new municipal electric light and power plant. Cost about \$175,000 with equipment. Froelich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

Tivoli Brewing Co., Detroit, recently organized, has taken over former Tivoli brewing plant, and plans expansion and modernization program. Permission has been asked to issue stock in amount of \$175,000, part of proceeds to be used for purposes noted. Louis W. Schimmel is president; A. N. Bayne, secretary and treasurer.

Marvel Coach Manufacturers, Inc., 19034 Celestine Street, Detroit, has been organized by Hugh L. McKeeney, 320 East Grand Boulevard, and associates, to manufacture automobile bus equipment, automobile trailers, parts, etc.

◀ SOUTHWEST ▶

Anderson-Prichard Oil Corp., Oklahoma City, Okla., will carry out expansion and improvements at oil refinery, Cyril, Okla. Contract for new distillation unit, capacity of about 1500 bbl. per day, has been let to Winkler-Koch Engineering Co., Oklahoma City.

City Council, Hominy, Okla., has arranged with Trans-American Construction Co., Phil-tower Building, Tulsa, Okla., for erection of new electric light and power house. Last noted company will purchase equipment and build plant, taking cost from revenue. Cost of works about \$150,000 with machinery. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., is consulting engineer.

City Council, Springfield, Mo., plans installation of pumping machinery and other equipment in connection with extensions and improvements in municipal sewage system, including new disposal plant. Cost about \$275,000. John F. Hendrickson is city engineer.

Department of Streets and Public Improvements, Maplewood, Mo., Fred Heidemann, director, is considering erection of a municipal electric light and power plant. Cost over \$100,000 with equipment.

Department of Interior, Office of Indian Affairs, Washington, has asked bids (closing date not stated) for new power house at Sequoyah Training School, Tahlequah, Okla., for central steam-heating service, including underground distributing system.

Department of Public Works, Little Rock, Ark., plans erection of new hangar at municipal airport, 100 x 140 ft., with repair facilities. Cost about \$30,000 with equipment.

Bureau of Prisons, Washington, Sanford Bates, superintendent, will take bids soon for new two-story and basement utilities building, 109 x 196 ft., T-shape, at Southwestern Reformatory, El Reno, Okla. Cost about \$200,000 with equipment. Hawk & Parr, Hales Building, Oklahoma City, Okla., are architects.

Texas Corp., 135 East Forty-second Street, New York, has plans for new bulk oil storage and distributing terminal at Corpus Christi, Tex., including extensions in pipe lines, etc. Cost about \$100,000 with equipment.

Neuhoff Brothers, Dallas, Tex., meat packers, are planning extensions and improvements in plant at North Dallas, acquired a few months ago, with installation of additional equipment. Cost about \$35,000.

City Council, Plainview, Tex., has plans for new municipal electric light and power plant. Cost over \$75,000 with equipment. Montgomery & Ward, Wichita Falls, Tex., are consulting engineers.

Hampton Core-Barrel & Supply Co., Inc., San Antonio, Tex., care of J. S. Wheelless, Jr., Milam Building, recently organized by Mr. Wheelless and associates, plans operation of factory for manufacture of oil well-drilling tools and kindred equipment. Harry D. Hampton, San Antonio, will head company.

◀ MIDDLE WEST ▶

Chicago Brewing Co., Chicago, recently organized, care of Richard Griesser & Son, 64 West Randolph Street, architect, has let general contract to Paschen Brothers, Inc., 33 North La Salle Street, for new plant at Diversey and Karlov Avenues, 228 x 325 ft., including power house and other mechanical structures. Cost about \$1,000,000 with equipment. Architects noted in charge.

Commanding Officer, Quartermaster Depot, Chicago, asks bids until Dec. 20 for 1700 steel ash or garbage cans (Circular 53).

City Council, Aberdeen, S. D., has extended date for bids for municipal electric light and power plant from Dec. 12 to Jan. 12, including Diesel oil engine-generator units, water cooling tower, fuel oil storage tanks, switchboard and accessories, electric distributing system, crane and auxiliary equipment. J. W. Henry, First National Bank Building, Aberdeen, is architect; Bemis Co., 105 West Adams Street, Chicago, is consulting engineer.

Bureau of Reclamation, Denver, asks bids until Feb. 3 for three, four or five vertical shaft hydraulic turbines, each 115,000-hp. capacity, with or without butterfly type shut-off valves; one or two 55,000-hp. vertical shaft hydraulic turbines, and one or two governors for such units, all for generating plant at Hoover Dam, Boulder City, Nev. (Specification 540).

Elk River Concrete Products Co., Helena, Mont., is planning new works at Miles City, Mont., for manufacture of steel-reinforced concrete culvert pipe. Cost close to \$25,000 with equipment.

Chicago, Rock Island & Pacific Railroad Co., Chicago, has increased operations at shops at Horton, Kan., recalling over 150 men for limited period.

Henningson Engineering Co., Union State Bank Building, Omaha, Neb., consulting engineer, has plans for new hydroelectric power plant and irrigation system along Middle Loup River, near Austin, Neb., for company now being organized by J. E. Rowman, Loup City, Neb., and associates. Cost over \$100,000 with equipment.

Universal Machine Products Co., 3242 North California Avenue, Chicago, has been organized by I. E. Teich and A. N. Weber to manufacture machinery and parts, and operate general machine works.

A. L. Hansen Mfg. Co., 5037 Ravenswood Avenue, Chicago, manufacturer of metal products, plans rebuilding part of plant recently damaged by fire. Loss about \$25,000 with equipment.

Badger Mfg. Corp., 6623 West Mitchell Street, West Allis, Milwaukee, maker of automobile bumpers, is liquidating its business, and its entire inventory, valued at \$250,000, was offered for sale at public auction Dec. 6-7.

Electric Motor Corp., Racine, Wis., recently organized by I. H. Dunham, has leased manufacturing space at 401 Lake Avenue and is installing equipment for production of fractional horsepower motors.

Geuder, Paeschke & Frey Co., 324 North Fifteenth Street, Milwaukee, is revamping its enameling department and installing some new equipment, as part of rehabilitation program.

◀ NEW ENGLAND ▶

Eaton, Dikeman Co., Lee, Mass., manufacturer of filter, matrix and other special papers, cardboard, etc., is planning to rebuild mill recently destroyed by fire. Loss about \$200,000 with equipment.

Town School Committee, Somers, Conn., E. K. Fuller, Thompsonville, Conn., secretary, will install manual training department in new two-story and basement school. Cost about \$150,000. Ebbets & Frid, Hartford, Conn., are architects.

Murphy & Potter, Inc., Providence, R. I., has been organized by William W. Murphy, Providence, and S. B. Potter, 60 Chiswick Road, Cranston, R. I., to manufacture machinery and parts.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one gear generator machine (Schedule 9236), one automatic screw machine and equipment (Schedule 9239), one brass-finishing lathe (Schedule 9249), one automatic screw machine and equipment (Schedule 9248), turret lathes and equipment (Schedule 9238), all motor driven, for Portsmouth, N. H., Navy Yard.

Valley Brewing Corp., Meriden, Conn., recently organized to take over former plant of Meriden Brewing Corp., is arranging financing in amount of \$153,000, part of fund to be used for extensions and plant modernization.

Baird Machine Co., Bridgeport, Conn., manufacturer of machine tools, tumbling barrels, etc., will defer erection of additions, each one-story, 100 x 100 ft., and 33 x 100 ft., respectively, for about three to four months. Bids will be asked at that time. Fletcher-Thompson, Inc., Fairfield Avenue, is architect and engineer.

Chapman Valve Mfg. Co., Indian Orchard, Mass., has made additions to working force, reinstating a number of men. Plant is now running on 5-day week basis.

General Electric Co., Schenectady, N. Y., has secured order for 39 transformers for Metropolitan Water District, Los Angeles, totaling about \$130,000 and will carry out production at Pittsfield, Mass., works, increasing manufacturing schedule.

◀ SOUTH CENTRAL ▶

United States Engineer Office, Louisville, asks bids until Jan. 5 for construction of lock and dam No. 5 on Green River, about 12 miles from Brownsville, Ky., including power house, lock operating machinery, etc.

Tennessee-Eastman Corp., Kingsport, Tenn., manufacturer of cellulose rayon products, affiliated with Eastman Kodak Co., Kodak Park, Rochester, N. Y., has begun expansion program, including new seven-story and eight-story units, with pumping plant and other structures. Cost over \$1,500,000 with machinery.

Allen Mfg. Co., Nashville, Tenn., and affiliated interest, Allen Corp., Franklin, Tenn., manufacturers of stoves, ranges, etc., have been acquired by Liberty Range Works, Inc., Nashville, manufacturer of kindred products, O. L. Dortch, president. Purchasing company will operate as subsidiary organization.

Frank Fehr Brewing Co., Louisville, is planning expansion and modernization program. Cost about \$300,000 with machinery.

United States Engineer Office, Memphis, Tenn., asks bids until Dec. 22 for one 5-kw. electric generating set.

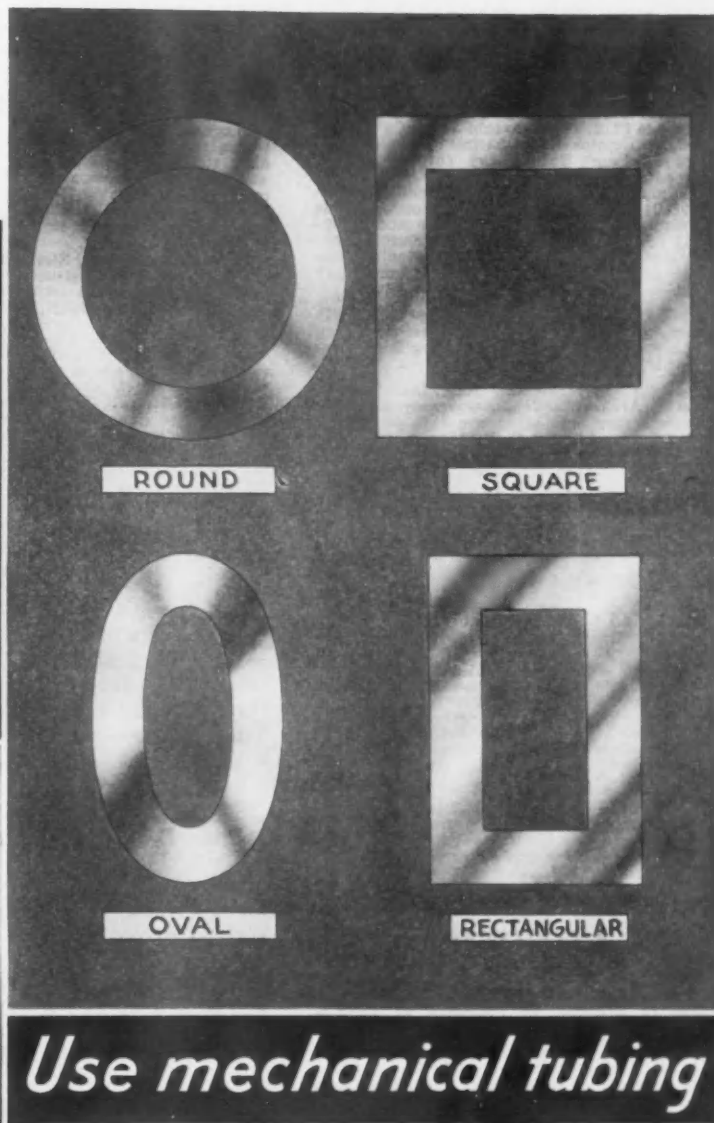
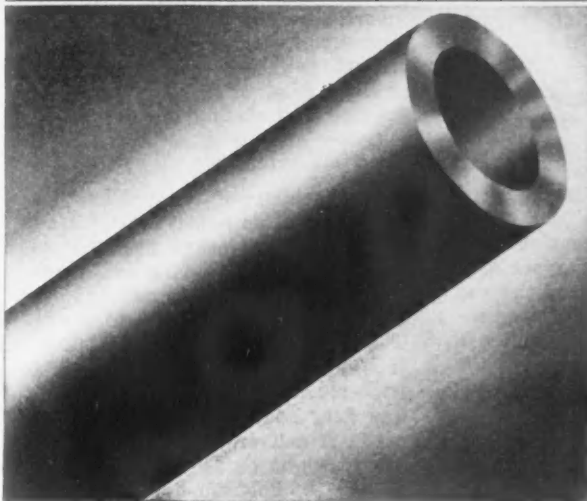
Louisiana Lime Products, Alexandria, La., recently organized by Warren G. Gray, Alexandria, and associates, plans development of limestone properties near Eaton, La., to include erection of hydrate lime plant, with crushing unit, battery of four lime kilns and auxiliary structures. Cost about \$35,000 with equipment.

◀ PACIFIC COAST ▶

Aztec Brewing Co., San Diego, Cal., recently organized by Herbert L. Jaffe and E. P. Baker, San Diego, has arranged for purchase of plant of Savage Tire Co., and will remodel for new brewing plant. Machinery will be installed for initial capacity of 100,000 bbl. a year. Cost over \$200,000. Richard Griesser & Son, 64 West Randolph Street, Chicago, are architects.

Board of City Trustees, Alhambra, Cal., is considering report by Burns-McDonnell-Smith Engineering Corp., Western Pacific Building, Los Angeles, consulting engineer, recommending steam-operated electric light and

FOR MORE PROFITABLE PARTS MAKING



Use mechanical tubing

Increase of profit, under present conditions, must be brought about in most cases by lowering of cost. Every detail of production, therefore, is being studied with economy in view.

Economy in the production of mechanical parts can be substantially bettered, and with increased satisfaction for the user, by adopting NATIONAL-SHELBY Seamless Tubing as the basic material. Different shapes, with ample variety of diameters and wall-thicknesses, are available. A single cut or light grinding may be the only operation necessary to turn out the finished part. Grades and treatments of steel are made to suit the intended use. The greatest uniformity in all respects is assured.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
Subsidiary of United States Steel Corporation

To obtain the quality and dependability that have made the name "SHELBY" preeminent wherever seamless tubing is used, be sure you specify NATIONAL-SHELBY, made by the largest manufacturer of tubular products in the world.

An informative booklet, "Seamless Tube Standards", may open the way to new economies for you in your shop. Write for it today.

NATIONAL-SHELBY

SEAMLESS MECHANICAL TUBING

power plant costing about \$1,000,000 with equipment, or Diesel engine-generating station at \$1,343,500. Site for plant has been selected.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one motor-driven geared-head gap lathe (Schedule 9212) for Mountain View, Cal., Navy Yard; two motor-driven boring mills (Schedule 9218) for Puget Sound Navy Yard; until Jan. 4, one motor-driven steel squaring shear machine and one slip roll forming machine (Schedule 9229) for Mountain View yard; one four-side molder, complete with motor drive and equipment (Schedule 9233) for Puget Sound yard; one motor-driven circular saw grinding machine (Schedule 9219) for Mare Island Navy Yard.

Producers Co-operative Packing Co., North Salem, Ore., fruit packers, plans rebuilding packing plant recently damaged by fire. Loss over \$125,000 with equipment.

National Steel Homes, Inc., Los Angeles, care of Alvin W. Wendt, Guaranty Building, representative, has been organized by Harley S. Bradley and Stuart G. Reid, to manufacture fabricated steel products for house construction.

Spokane Brewing & Malting Co., Lincoln Avenue and Broadway, Spokane, Wash., has plans for extensions and improvements, with installation of additional machinery. Cost over \$75,000. G. A. Pehrson, Old National Bank Building, is architect; A. M. Isleib is company engineer.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 21 for four 1000-hp. watertube boilers, with superheaters, oil burners, automatic control equipment with master control, soot blowers, valves, piping, etc. (Specification 7119) for Mare Island Navy Yard; bids (no closing date stated) for 100-kw. gasoline engine-generating set, with gasoline tanks, switchboard and accessories (Specification 7050) for Naval Ammunition Depot, Hawthorne, Nev.

Sacramento City School District, Sacramento, Cal., plans vocational training department in new junior high school group, for which bids are being asked on general contract. Cost about \$300,000. Dean & Dean, California State Life Building, are architects.

◀ FOREIGN ▶

French State Railways, Bureau of Engineering, Lyons, France, has approved plans for one-story addition to foundries at locomotive and car works. Cost over \$200,000 with equipment.

Norsk Hydro Co., Heron, Norway, is planning erection of a new plant for production of soda ash. Later expansion will be carried out for manufacture of caustic soda. Cost over \$200,000 with machinery.

Mexican Eagle Oil Co., Mexico City, Mexico, is planning extensions and improvements in bulk storage and distributing plants, including new pumping machinery and other equipment; also, extensions in oil pipe lines for service at Mexico City, Puebla, Toluca, Pachuca and other points. Cost over \$250,000.

Municipal Government, Budapest, Hungary, is planning erection of new benzol plant, to be operated in conjunction with municipal artificial gas works. Cost about \$200,000 with machinery.

Trade Notes

William B. Scaife & Sons Co., Oakmont, Pa., manufacturer of water softening and purification systems, has opened a sales and engineering office at 42 East Avenue, Rochester, N. Y., under the management of F. H. Wisewell. Mr. Wisewell, who has been with the United States Gypsum Co., has had an extensive experience as an engineer and constructor in the power and industrial plant field.

Rust Furnace Co., Pittsburgh, has been awarded, by the Babcock & Wilcox Co., Barberton, Ohio, the contract for designing and building the Hoover dam stress relieving furnace. This furnace, which is of special design, will be used to heat large sections of steel pipe, after they are welded by the Babcock & Wilcox Co., in order to relieve the stress set up by the welding operation. The large sections of pipe will be 30 ft. diameter by 24 ft. long, made of 2 1/4 in. thick plates, and each will weigh approximately 150 tons.

Cleveland Tractor Co., Cleveland, has reduced the price of the Cletrac model 80 tractor to \$4,650, which is equivalent to 24.5c. per lb. drawbar pull. The company states that the lower price has been made possible through manufacturing economies.

Associated Alloy Steel Co., Inc., will close its offices Jan. 1, 1933, and thereafter the three constituent companies will market their products through their own sales organizations. These are the Ludlum Steel Co., Watervliet, N. Y., Sharon Steel Hoop Co., Sharon, Pa., and Timken Steel & Tube Co., Canton, Ohio. The Associated Alloy company was organized nearly three years ago to handle the sales of corrosion, heat and wear resisting alloy steels produced by the three constituent companies. The company, which is under the management of David B. Carson, has its main offices in the Union Trust Building, Cleveland, and various branch offices.

Barber & Ross, Inc., Eleventh and G. Streets, N. W., Washington, structural steel fabricator, has established a wholesale and jobbing department for the District of Columbia and nearby territory.

Dean Machinery Co., 80 East Jackson Boulevard, Chicago, has been appointed Chicago sales representative of Consolidated Tool Corp., Rochester, N. Y. This arrangement covers the complete line marketed under the following trade names; Betts, Newton, Colburn, Hilles & Jones.

New Trade Publications

Airbrushes.—Paasche Airbrush Co., 1906 Diversey Parkway, Chicago. Bulletin No. CC10-32 giving price list and directions for convertible universal multiplehead airbrushes which are made in seven sizes. Multipleheads are listed in 13 sizes with fluid orifices ranging from 0.028 in. to 1/2 in. diameter.

Mercury Arc Rectifiers.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1907-B describing a new sectional type of rectifier which makes possible new service continuity standards. Advanced construction features of the rectifier are thoroughly covered.

Welding Equipment.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Arc welding data bulletin No. 16, describing features, characteristics and application of the company's FlexArc welders.

Rod Reel Runs Continuously

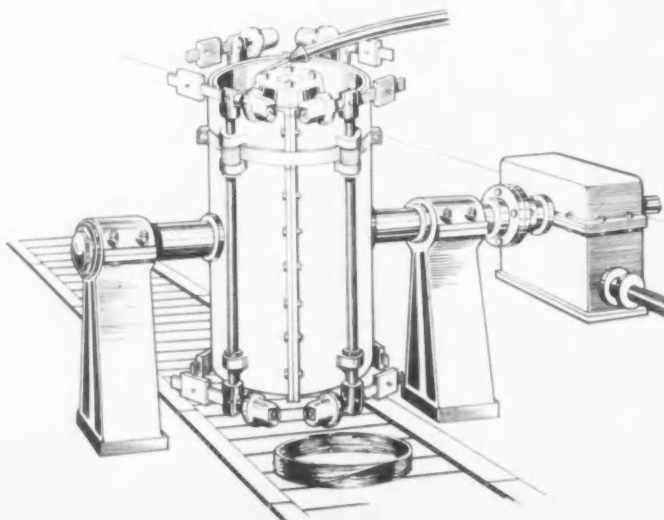
THE United Engineering & Foundry Co., Pittsburgh, has acquired an exclusive license for the manufacture and sale of the Perrett rod reel, a newly invented swivel-type double-bucket reel, self-discharging, requiring no stripper or kickoff, and running continuously.

Instead of the customary vertical shaft and pins used in the conventional pin reel, the machine has two cored buckets, one on each end of a vertical drive. The rod is delivered through a pipe guide to the upper bucket, which rotates continuously, and is laid up in regular layers as a coil. As soon as the end of the rod has arrived, the entire coiling assembly, which is mounted on trunnions, is rotated vertically, interchanging the two buckets. The lower bucket is immediately brought into the upper, or receiving position, and is rotated in the same direction as the previous one. The loaded bucket, with its finished coil, travels to the lower or inverted position, and the coil is deposited upon the conveyor ready for wiring or further treatment.

To retain the coil during the swivel

motion a set of coil arms extends over the open top of each bucket with guide rollers to protect the coil from damage. The coil arms remain in this position until the bucket is completely inverted and is ready for discharge, whereupon they are thrown back and the coil falls gently upon a conveyor or chute or other delivery device. The opening and closing of the coil arms may be automatic or controlled by small air cylinders.

A machine of this kind, it is claimed, will do nearly twice as much work as the average reel, being in almost continuous operation. Buckets can be for any size of coil and easily changed from one size to another. The reel enables the operating man, it is added, to turn out more tonnage with much less of an investment and less floor space requirement, and because it delivers the rods as smooth and straight as they are rolled with nothing to hold up his mill. To the maintenance man it is a simple machine, accessible and without complicated parts. It may be used singly or as one unit in a battery of reels, depending upon the output of the mill.

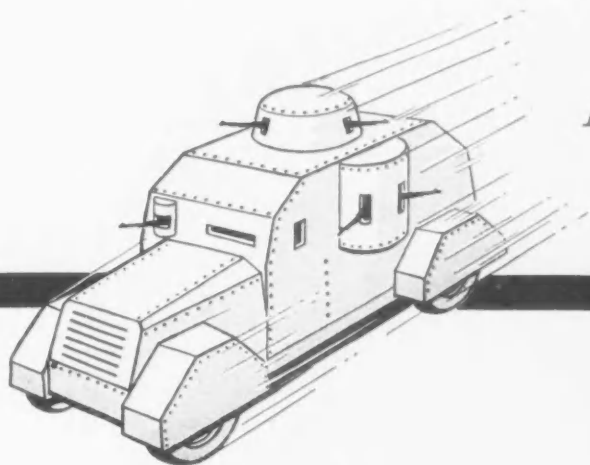


WHEN one reel is completed in the bucket at the top, arms extend over the top of the bucket, the entire assembly is rotated one-half revolution on the horizontal trunnions, the arms are thrown back out of the way, the reel is gently dropped upon the conveyor, and meanwhile the bottom bucket is now in position to make the next reel.

E. M. BRIQUETS

GIVE your cupola alloys

Armored Car Protection



WHEN your cupola alloys are added in the form of E. M. Briquets, they pass through the oxidizing upper zones as unmolested as an armored car through city streets. Impurities cannot rob them of the benefits they bring to your iron. Here is the reason: • Each E. M. Briquet holds a definite weight of manganese, chromium, or silicon in a refractory binder. Only at the hottest zone does the binder dissolve and release the uncontaminated alloy to the iron. As a result, none of the alloy is wasted, and profit-consuming off-iron is prevented. • If you are seeking a way to produce better castings at lower costs it will pay to investigate the many



This E. M. BRIQUET was removed just before entering the melting zone and shows how the alloy is protected from oxidation during its descent through the upper oxidizing zone of the cupola.

advantages E. M. Briquets offer you. A request on your letterhead will bring you complete information. Insure better foundry practice by making that request today.

● Electromet Ferro-Alloys & Metals

ELECTRO METALLURGICAL SALES CORP.

Unit of Union Carbide and Carbon Corporation



CARBIDE and CARBON BUILDING, 30 EAST 42nd ST., NEW YORK, N. Y.

When a Group Does the Buying, How Shall I Sell?

(Concluded from page 911)

method of buying which is gaining such vogue in business. He said, "After you learn how to deal with this new situation, you like it. You have to call on more persons in each prospect concern. You can't see so many prospects. You have to travel slower. But after you do get an order it generally sticks, and best of all your average order is likely to run higher."

How the Salesman Sells a Group

How, then, shall this situation be dealt with? In answering this question let me first relate the story of a rustless steel salesman. For several years he has been selling alloys, but since 1929 has been concentrating on rustless. Despite the depression, he has achieved a remarkable record.

This man confines himself to a few choice prospects at a time. Usually he does not approach a prospect until he knows a great deal about his business. He may make a preliminary call or two, to get the attitude of the prospect toward his product, but he never makes any attempt to sell on these initial visits. Before he makes his first selling call, he finds where the concern could use rustless steel and what material is being used now. He learns what is paid for the present material, how much of it is used and whether it is giving complete satisfaction. He discovers what production difficulties may be occurring due to the use of the rival metal. He gets the same sort of information about his prospect's leading competitors. Finally he ascertains how many persons in the prospect concern must be sold, and who these persons are.

Then he is ready to present his story. And what a story it is, showing as it does a startling familiarity with the prospect's business. He "soft-pedals" his own product in his talk, and puts all the emphasis on the thing that is nearest the heart of his listeners—their business. Of course, the ultimate purpose of his demonstration is to show his prospects that their business will be benefited by the use of his metal.

Where possible he assembles all of the buying group to listen to his talk. More frequently, however, he can get only a part of the group together. Often he is obliged to talk to them one at a time. On one occasion he found it necessary to sell 17 persons. As luck would have it, the 17 were scattered all over North America. To reach them he had to travel thousands of miles, but he did not let up until the story was delivered to every last one of them. The order that he eventually got more than compensated him for all the expense and trouble involved in making the sale.

Of course there is nothing new about the art of selling to executive groups. Many concerns have been doing it for years. Companies who are strangers to this type of selling can learn much from the veterans who long have been marketing their goods in this manner.

Such a veteran is a crane and hoist manufacturer. It is this organization's experience that in nearly every case some one man wields a paramount influence in the purchase of equipment of this sort, but seldom is his the sole influence. Another thing that this company has discovered is that this man is rarely the same man, so far as his title is concerned, on any two jobs. He may be the draftsman in one concern and the banker in another.

The first step in this company's attack on its market is its year-round advertising campaign. This advertising has the following objectives:

1. To acquaint readers with this particular type of equipment, and to familiarize them with the name of the manufacturer.
2. To educate readers on the need for equipment of the kind advertised; to tell them of the benefits they may expect to derive from the installation of the product.
3. To isolate actual prospects from the mass of readers, who are actually interested in the cranes and hoists advertised.
4. To pave the way for the advertiser's salesmen, to break down resistance for them and to make it easier for them to approach the readers.
5. To get inquiries from the readers who are interested, so that the salesmen will have definite prospects to follow up.

When this company receives an inquiry from a prospective buyer, its problem in approaching that concern is greatly simplified. All that has to be done is to see the man who initiated the inquiry. He, at least, is interested. If other persons in the organization have to be seen, he can introduce the salesman to them, and lend his influence in selling them. Very often it is found that these other persons have been reading the manufacturer's advertising. Usually this makes it comparatively easy for the salesman to line up the group behind his proposition.

This concern has found that on a small installation, say on a hoist not exceeding \$500, only the department head under whom the product will be used has to be sold. Generally, he makes such a purchase on his own initiative. He may, however, ask his superiors to approve his action. If he does not ask immediate approval, he depends on the results from the

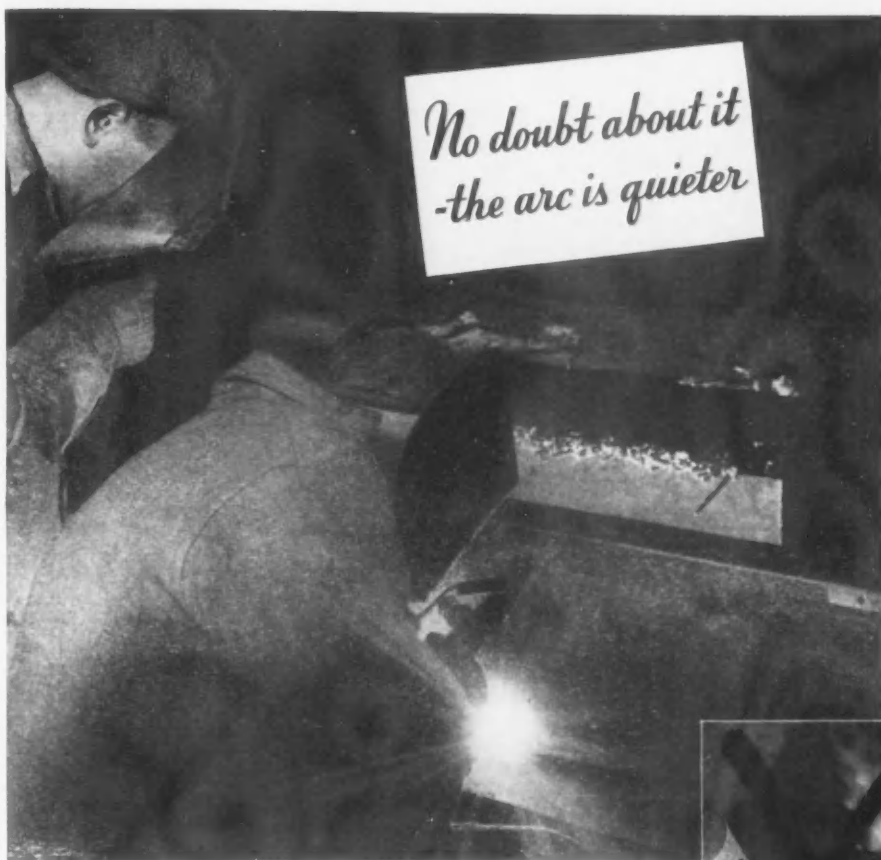
use of the equipment to justify his judgment.

On larger sales, the man in charge of the prospect's maintenance is the one that should be approached at the outset of the negotiations. It is his job to maintain low costs and to operate with the greatest possible efficiency. Naturally, he is always on the lookout for any machinery or equipment that will help him attain his objectives. Without his influence it is most difficult to sell capital goods to this type of business.

Nine times out of ten, though, this man can help only in getting the order started. To get it "O.K.'d" it is usually necessary to sell the management. On big deals the board of directors frequently has to be sold. The company employs salesmen who are capable of making a convincing presentation even to the most forbidding groups. Here again the salesmen are helped tremendously by their firm's advertising. It dragnets the industries to which the product is offered, reaching not only shop bosses with varying authority but also the moneyed interests in the business.

In certain fields this organization starts its selling in its prospect's drafting room. Companies in a number of industries have their own engineers decide on the type of material handling equipment to be used. For example, some of the automobile companies do this. When the equipment salesman is able to get in a few licks with these engineers, he is generally able to shut off competition at the base. In giving the designers the benefit of his more extensive experience in material handling, he can at the same time get them to incorporate specifications in their layout that can only be filled by installing his system. Where this sort of strategy has been followed, it is easy to get the management to buy the equipment that was specified by the engineers. This is particularly the case because this manufacturer leaves nothing to chance. His advertising breaks down resistance for his equipment all along the line, from the chairman of the board to the lowest member of the factory staff.

A number of such stories could be related. While they would differ in detail, they would all prove the point that we are destined to see more and more of this kind of selling. It is the only way to deal with group buying. And while buying by groups is increasing greatly because of the depression, nevertheless the movement has been under way for many years. It is true that the delegation of authority to competent executives is a cardinal plank in the kind of management that has been most successful in the United States. On the other hand, decentralized operations of this sort are satisfactory only when they are coordinated centrally, such as by control of an executive group.



THESE ELECTRODES REDUCE SPATTERING *and that means cleaner welding*

It's the heavy mineral coating on a Murex Electrode that does the trick. In operation, this coating extends slightly beyond the metal core. Just enough to provide proper spacing of the arc when the electrode is held in light contact with the work. A short, quiet arc is easily, in fact, almost automatically maintained. There is practically no spattering. Deep penetration, without undercutting, is assured.

A smoother deposit, that saves time and money by reducing the amount of cleaning and machining after welding, is the inevitable result of the quiet Murex arc.

You will find that this is but one of the many advantages of Murex Welding. Your welders will like to use Murex Electrodes because they are easier to use, because they burn without objectionable fumes or smoke, and because they can be bent

for better manipulation without injury to the coating.

SEND FOR THE MUREX BOOKLET

The physical properties of Murex deposited metals, which will more than meet your requirements, are described in a booklet giving complete information on Murex Electrodes for welding mild steel, boiler plate, manganese and high carbon steels, and heat and corrosion resisting alloys. Write for a copy.

METAL & THERMIT CORPORATION, 120 BROADWAY, NEW YORK, N. Y.
ALBANY . PITTSBURGH . CHICAGO . SOUTH SAN FRANCISCO . TORONTO

MUREX

HEAVY MINERAL COATED ELECTRODES



Machines and Operations in Making Rockne Motor Blocks

(Continued from page 915)

drilled by an automatic Avey unit mounted on this machine.

At the next machine the distributor shaft hole is fly-cut and counterbored. An Avey unit mounted on the machine finishes the oil relief hole. Next in line is a machine, fitted with an Avey unit, which reams the distributor shaft hole and drills an oil hole. The block is again turned over before passing to a machine where 33 holes are drilled in the bottom for bearing cap and oil pan stud bolts. The bearing cap holes are counterbored on a radial drill.

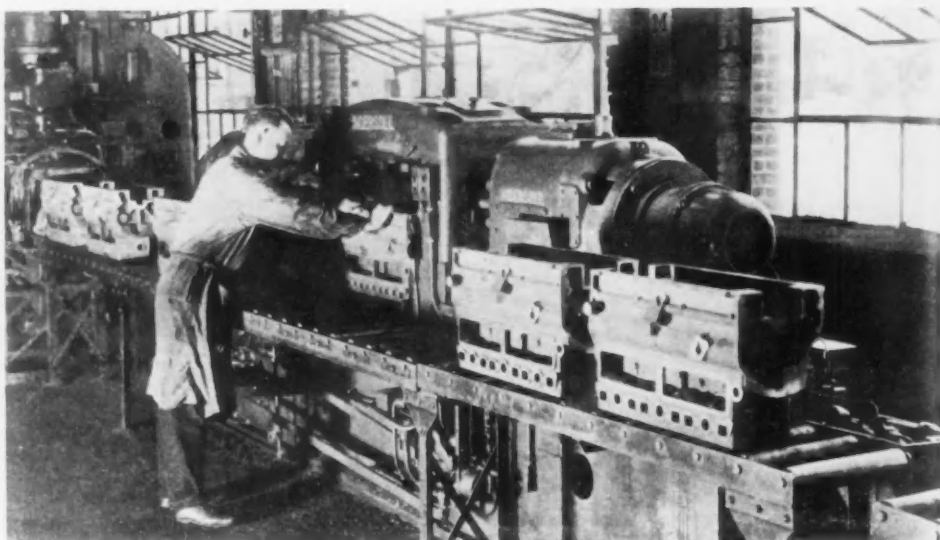
The next machine taps 32 holes in the bottom of the block and at the next station on the conveyor the bearing caps are assembled on the block.

Semi-finish boring the crank and cam bearings is the next operation. This machine automatically locates the block, clamps it in place, bores the bearings and turns on air to remove the chips. It also counterbores the rear cam bearing and the rear crankshaft bearing. A similar machine then finish bores the operations performed on the previous machine and reams two holes in the rear end of the block. Another machine of similar design finish reams these bearings.

An inspector stands at the next station and he is followed by a drill which taps 24 holes in the top, 18 holes in the front end, 8 holes in the rear end and 16 holes in the valve side. Thrust bearings are hand faced at the next station.

An Oilgear press then places the valve stem guide bushings after which these bushings are reamed. At the next machine 13 angular holes are tapped by three heads. The next machine final reams the six cylinder bores at one operation and at the next station the bores are lapped six at a time on a single machine.

The block is then turned over to drain kerosene from the bores. Then follows a complete inspection of the bores. It may be stated here that operators are equipped with gages and must follow closely the limits permitted on the work entrusted to them. Finally the valves are hand seated and ground in by machinery. The blocks then pass in a straight line through washing equipment to a



Besides core drilling the camshaft and crankshaft holes, three minor operations are also performed on this machine

straight run of roller conveyor, which is in effect a storage space. At the end of this run the conveyor turns at right angles to the motor assembly line. This is the first break in this conveyor from a straight line with the exception of several minor jogs that were installed to compensate for the various sizes and types of machines

and so to hold adequate aisle space.

When a motor is completely assembled, tested and run in, it is carried by an overhead conveyor to the box-car loading platform. The cars are especially prepared to receive the motors with minimum expenditure for blockings and fastenings. Delivery is made to the Rockne plant at Detroit.

Roller Chain Treated to Resist Corrosion

THE Link-Belt Co., Chicago, has announced a new roller chain, named Link-Belt Silverlink, the side bars of which are especially treated to resist corrosion. This treatment results in a silver appearance. The chain is made in all sizes from $\frac{3}{8}$ in. to $2\frac{1}{2}$ in. pitch and in single or multiple widths. It is available with wheels, for any horsepower, also with conveying attachment links in wide variety. Complete drives are carried in stock by distributors in sizes up to 225 hp., in speed ratios of 1 to 1 up to 8 to 1.

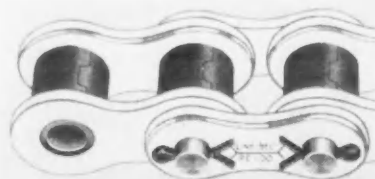
Features include: Side bars of alloy rolled steel, heat-treated for strength and toughness; nickel steel case-hardened pins, detachable type with cotter, or furnished riveted; solid steel case-hardened bushings, and alloy-steel heat-treated rollers. The Link-Belt curled roller is made from strip steel having a strong fibrous structure, with the fiber running around instead of across the roller, so as to give the greatest strength and resilience to the roller and offer

the maximum resistance to shock. Uniformity and close clearances throughout are emphasized as assuring accuracy of pitch and smooth chain operation.

Sheet Packing for Oil, Gasoline and Water

THE new sheet packing for gasoline, oil and water recently placed on the market by the Garlock Packing Co., Palmyra, N. Y., combines granulated cork with tough paper fiber, which mixture is bound together with a liquid-proof compound. The high percentage of cork particles is said to furnish unusual resiliency and softness, while the paper fiber gives the toughness and durability necessary in a packing for gasket use. It is stated also that this packing, designated as the Garlock 660, will not shrink, crack, curl or become brittle in stock, and that it cuts clean and easily. It is manufactured in all standard thicknesses from 0.010 to $\frac{1}{4}$ in. Gaskets of this material can be furnished in any size or shape.

PATENTS covering a rubber belting that resists chemicals and oils have been issued to the B. F. Goodrich Co., Akron, Ohio. This belting, it is stated, has given satisfactory service after complete immersion in oil for several days. B. S. Taylor, manager of material development for the company's processing division, is the inventor.





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